

*In paper Royal 1818*  
MEDICAL ESSAYS

AND

OBSERVATIONS,

Published by a

SOCIETY in EDINBURGH.

VOLUME V. PART I.

The FIFTH EDITION.

EDINBURGH:

Printed for T. CADELL, LONDON; and  
JOHN BALFOUR, EDINBURGH.

M,DCC,LXXI.

## The P R E F A C E.

A Society being formed in this place for the improvement of Natural Knowledge, in which all the branches of medicine are included; and the members of our society being adopted into this new one, the design of publishing more volumes of medical papers was dropt some time ago.

It is now at the desire of the gentlemen of this new society that we cause this fifth volume to be printed, which is so much enlarged by the papers which they generously furnished us from their repository, that we are obliged to divide it into two parts. The first of these, containing the Register of the Weather, Account of epidemical Diseases, papers on the Materia Medica, Chemie, Anatomy, Animal OEconomy, and Surgery, is now in your hands, through the impatience of the booksellers, who would not delay the publication of this part till the second, containing papers on the Theory and Practice of Medicine, the Improvements made elsewhere, List of Books published, and Nouvelles Littéraires, was also printed, though it is ready for the press.

The comparifon of our meteorological registers and accounts of epidemical diseases, with those made at other places in the same period of time, which you see in this first part, and the general index to all our five volumes, which will be put to the second part, are sufficient signs of this collection being at an end.

## The P R E F A C E.

The demand for our collections at home and the translations of them published in different parts of Europe, make us flatter ourselves, that we have not been uselessly employed in giving our volumes to the public. We have good reason to think, that the labours of the new society, to which we cheerfully yield our place, will prove of as much greater advantage to mankind, as their plan is more extensive than ours.

In name of this society, we invite to their correspondence all gentlemen of whatever nation, who have experiments or observations relating to natural knowledge to communicate, or who please to propose useful investigations or experiments to be made by the society. The Letters designed for them are to be addressed to Dr Andrew Plummer, professor of medicine in the university of Edinburgh, or Alexander Monro professor of anatomy in said university, joint secretaries to the society; and whatever is delivered under such an address to any of the booksellers, whose names are on the title page of this volume, will be carefully conveyed to the society.

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M E D I C A L  
E S S A Y S  
A N D  
O B S E R V A T I O N S.

A R T I C L E I.

*The Meteorological Register.*

**T**HE instruments with which the Observations in the following Register of the weather were made, are the same as were employed for the Registers of the former volumes.

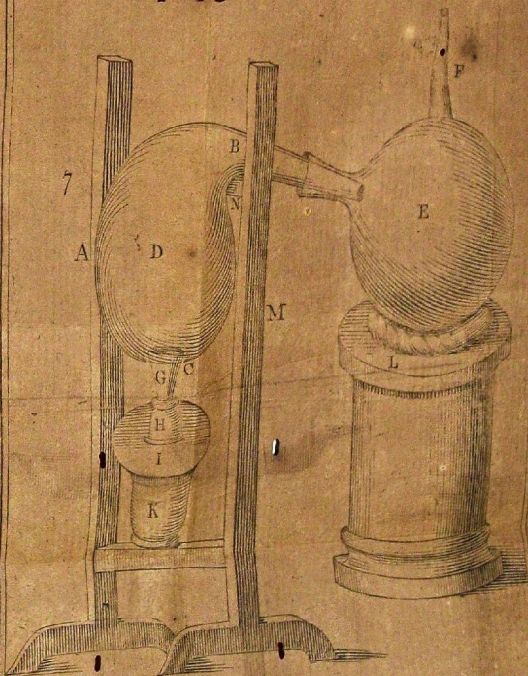
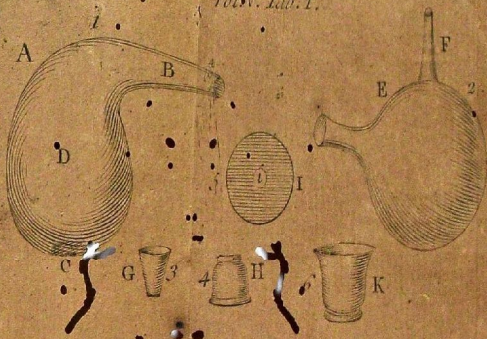
VOL. V.

A

JUNE

JUNE 1735.

D.	Hour.	Baro.		Ther.		Hyg.	Wind.		Weather.
		In.	D.	In.	D.		Dir.	For.	
1	9 a m	29	7	13	7	2	1	N E	2 fair
	8 p m	29	7	13	8	2	0	N E	1 fair
2	9 a m	29	9	13	5	2	0	N E	1 fog
	8 p m	29	9	12	8	2	5	N E	2 fog
3	9 a m	30	0	13	6	2	8	N E	2 fog
	8 p m	30	0	13	7	2	2	N E	2 fair
4	9 a m	30	0	13	7	2	0	N E	1 fair
	8 p m	29	9	15	1	1	9	S	2 fair
5	9 a m	30	0	12	5	1	8	N W	2 cloudy
	8 p m	30	1	12	1	1	5	N W	2 cloudy
6	9 a m	30	1	13	0	1	3	N W	2 fair
	7 p m	30	0	14	9	1	3	E	2 fair
7	9 a m	29	9	13	2	1	8	E	1 fair
	7 p m	29	8	14	5	1	5	W	1 fair
8	9 a m	29	8	14	8	1	5	W	1 fair
	7 p m	29	7	13	8	1	4	S W	2 cloudy
9	9 a m	29	7	14	0	1	5	S W	2 cloudy
	8 p m	29	6	13	6	1	4	W by S	2 fair
10	9 a m	29	6	13	5	1	4	W	1 fair
	7 p m	29	7	13	2	1	5	N W	1 cloudy
11	9 a m	29	7	13	6	1	6	W	1 cloudy
	7 p m	29	7	14	7	1	3	W	1 fair
12	9 a m	29	8	13	7	1	6	W	0 cloudy
	7 p m	29	8	13	7	1	4	W	1 cloudy
13	9 a m	29	6	14	0	1	8	W	1 fair
	7 p m	29	8	13	9	1	6	W	2 cloudy
14	9 a m	29	8	13	7	1	6	W	1 cloudy
	8 p m	29	8	13	3	1	4	W	0 fair
15	9 a m	29	7	15	5	1	4	S by W	2 fair
	8 p m	29	6	14	7	1	3	S by W	2 cloudy
16	9 a m	29	4	11	8	1	5	W	2 cloudy
	9 p m	29	4	12	6	1	5	W	2 fair



# AND OBSERVATIONS

JUNE 1735.

D.	Hour.	Baro. In D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather.
17	9 a m	29 4	4	2 1	4 S	2 cloudy
	7 p m	29 4	3	3 1	5 S E	2 fair
18	9 a m	29 5	4	2 1	6 E	2 cloudy
	9 p m	29 6	3	4	7 E	2 fair
19	9 a m	29 6	12	1	8 E by N	2 fog
	6 p m	29 6	3	6	6 E by N	2 fair
20	9 a m	29 7	3	1	4 N E	2 fog
	8 p m	29 7	3	2	0 N E	2 fog
21	9 a m	29 8	3	8	4 N E	2 fair
	8 p m	29 8	3	2	1 E by N	2 cloudy
22	9 a m	29 7	4	2	1 N W	2 cloudy
	6 p m	29 7	4	4	1 N E	2 cloudy
23	9 a m	29 8	2	2	1 N E	2 fair
	8 p m	29 9	3	8	1 N E	1 fair
24	9 a m	29 8	4	0	1 W	2 cloudy
	8 p m	29 7	3	8	1 W	1 fair
25	9 a m	29 5	3	2	1 W	2 cloudy
	8 p m	29 5	1	4	1 W	2 fair
26	9 a m	29 4	13	2	1 W	1 cloudy
	8 p m	29 5	13	4	1 W	3 cloudy
27	9 a m	29 6	13	6	1 W	2 fair
	8 p m	29 6	13	6	1 W	2 fair
28	9 a m	29 6	14	5	1 W	2 cloudy
	8 p m	29 5	13	5	1 S E	1 rain
29	9 a m	29 4	13	2	2 W	2 cloudy
	9 p m	29 4	12	5	1 W	2 fair
30	9 a m	29 6	13	6	1 N W	2 cloudy
	8 p m	29 7	13	7	1 W	2 fair

Gr. height 30 1 15 5 2 8

L. height 29 4 11 8 1 3

H at a med. 29 7 13 5 1 6

# MEDICAL ESSAYS

JULY 1735.

D.	Hour.	Baro. In. D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather.
29	a m	29 6	14 4	1 7	W	1 fog
8	p m	29 5	14 3	1 5	W by N	2 fair
29	a m	29 5	14 6	1 5	S by E	1 cloudy
8	p m	29 4	12 5	2 8	SE	2 fog
30	a m	29 5	13 6	2 7	S W	1 cloudy
7	p m	29 6	14 7	1 5	W	2 fair
49	a m	29 7	12 1	3 0	NE	2 cloudy
8	p m	29 8	12 4	2 2	NE	2 cloudy
59	a m	29 9	13 1	2 3	NE	1 cloudy
8	p m	29 9	13 0	2 5	NE	1 fog
69	a m	30 0	13 4	2 8	NE	2 fog
7	p m	29 9	12 3	2 6	NE	2 fog
79	a m	29 7	14 3	3 0	NE	2 cloudy
8	p m	29 7	15 6	3 0	NE	1 cloudy
89	a m	29 6	13 0	2 4	N by W	2 rain
8	p m	29 6	13 0	2 7	N by E	1 cloudy
99	a m	29 7	13 8	1 4	N by W	1 fair
8	p m	29 7	14 2	2 2	N	2 cloudy
109	a m	29 6	13 0	2 1	NE	1 fair
7	p m	29 5	13 5	2 0	W	2 cloudy
119	a m	29 6	13 1	2 0	W	1 fair
8	p m	29 5	13 4	1 9	W	2 fair
129	a m	29 3	13 7	1 6	SE	2 cloudy
8	p m	29 2	13 6	1 6	SE	2 cloudy
139	a m	29 1	13 7	2 0	W	2 cloudy
8	p m	29 2	13 4	1 8	N W	2 cloudy
149	a m	29 4	13 5	1 8	W	2 fair
8	p m	29 5	13 0	1 6	W	2 fair
159	a m	29 4	13 3	1 8	N	2 fair
8	p m	29 4	14 1	1 7	S by E	2 cloudy
169	a m	29 2	12 7	3 0	NE	2 rain
8	p m	29 2	13 3	2 8	E	1 rain

# AND OBSERVATIONS.

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JULY 1735.

D.	Hour.	Baro. In D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather.
17	9 a m	29	4 13	7 2	3 W	2 cloudy
	8 p m	29	6 13	4 2	0 N W	1 cloudy
18	9 a m	29	8 12	7 2	0 N W	1 fair
	8 p m	29	9 13	3 1	4 N W	1 fair
19	9 a m	29	9 14	4 2	5 S by W	1 fair
	8 p m	29	8 14	0 1	5 S by W	2 cloudy
20	9 a m	29	6 14	5 1	8 W	2 cloudy
	8 p m	29	7 14	6 1	5 N W	2 fair
21	9 a m	29	9 14	2 1	6 E	2 fair
	8 p m	29	9 14	4 1	5 E	2 fair
22	9 a m	29	7 14	2 1	5 S E	1 fair
	8 p m	29	6 13	7 1	5 E	2 rain
23	9 a m	29	5 14	1 2	4 S by E	0 cloudy
	8 p m	29	4 14	4 2	0 S by E	0 cloudy
24	9 a m	29	4 13	3 1	8 W	2 cloudy
	8 p m	29	4 13	5 1	6 W	2 cloudy
25	9 a m	29	4 14	5 1	6 S W	2 fair
	8 p m	29	4 14	3 1	5 S W	2 fair
26	9 a m	29	5 13	8 1	7 W	2 cloudy
	8 p m	29	7 14	4 1	6 W	2 fair
27	9 a m	29	8 13	4 1	8 S W	2 cloudy
	8 p m	29	8 14	0 1	5 S W	2 fair
28	9 a m	29	9 15	6 1	6 S W	2 fair
	8 p m	29	9 15	2 1	6 S W	2 fair
29	9 a m	30	0 15	5 1	6 S W	1 fair
	8 p m	30	0 15	5 1	6 N E	1 fair
30	9 a m	29	9 15	6 1	7 S E	2 fair
	8 p m	29	9 16	0 1	4 S E	2 fair
31	9 a m	29	9 15	2 1	8 S E	2 cloudy
	8 p m	29	9 15	6 1	8 S E	2 cloudy
Gr. height 30		0 1	0 3	0		
L. height 29		1 12	1 1	4		
H. at a m d. 29		7 14	2 1	9		

# 6 MEDICAL ESSAYS

AUGUST 1735.

D.	Hour.	Baro.		Ther.		Hyg.		Wind.		Weather.
		In.	D.	In.	D.	I.	D.	Dir	For.	
1	9 a m	29	9	15	0	1	9	S E	1	cloudy
	8 p m	29	9	15	6	1	5	S E	2	cloudy
2	9 a m	30	0	15	7	1	4	S E	2	fair
	8 p m	30	0	15	2	1	7	W	1	cloudy
3	9 a m	30	1	14	0	1	5	S W	1	fair
	8 p m	30	1	14	7	1	5	S E	2	fair
4	9 a m	30	2	14	0	1	5	S E	2	cloudy
	8 p m	30	3	14	3	1	6	E	2	cloudy
5	9 a m	30	3	13	2	1	9	N E	2	cloudy
	8 p m	30	3	13	2	1	6	N E	2	fair
6	9 a m	30	3	13	0	1	7	N E	2	cloudy
	8 p m	30	3	13	0	1	7	N E	1	fair
7	9 a m	30	3	14	0	1	6	N E	2	fair
	8 p m	30	3	14	2	1	5	E	2	fair
8	9 a m	30	3	13	7	1	6	E	2	cloudy
	7 p m	30	2	13	7	1	5	E	1	cloudy
9	9 a m	30	3	12	9	1	5	E	1	cloudy
	7 p m	30	3	14	6	1	4	E	1	fair
10	9 a m	30	3	14	7	1	7	E	1	fair
	7 p m	30	3	15	3	1	5	E	1	fair
11	9 a m	30	3	16	1	1	6	E	1	fair
	7 p m	30	3	17	0	1	6	S W	1	cloudy
12	9 a m	30	2	16	9	1	7	S W	2	cloudy
	7 p m	30	2	16	6	1	4	S W	2	fair
13	9 a m	30	0	15	6	1	7	S W	2	cloudy
	7 p m	29	8	15	3	1	5	S W	2	cloudy
14	9 a m	29	6	13	5	1	5	W	2	rain
	7 p m	29	6	13	4	1	7	W	2	cloudy
15	9 a m	29	7	13	2	1	7	W	2	fair
	7 p m	29	7	13	7	1	4	W	2	fair
16	9 a m	29	8	13	7	1	6	W	2	fair
	8 p m	29	8	13	4	1	4	W	1	cloudy

# AND OBSERVATIONS.

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AUGUST 1735.

D.	Hour.	Baro. In D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather.
17	9 a m	29	8 13	6 1 7	S W	2 cloudy
	7 p m	29	6 14	3 2 0	S W	2 rain
18	9 a m	29	5 14	9 2 6	S W	2 cloudy
	7 p m	29	4 15	3 2 1	S W	2 cloudy
19	9 a m	29	6 14	6 2 0	S W	2 fair
	7 p m	29	6 13	4 1 6	W	2 fair
20	9 a m	29	6 14	0 1 7	W	2 cloudy
	7 p m	29	6 13	5 1 6	W	2 fair
21	9 a m	29	4 13	6 1 9	W	2 fair
	7 p m	29	4 13	7 1 5	S W	2 cloudy
22	9 a m	29	4 13	3 1 7	W	2 fair
	7 p m	29	3 13	3 1 6	W	2 fair
23	9 a m	29	5 11	5 3 0	S W	2 cloudy
	7 p m	29	6 12	3 1 9	S W	2 fair
24	9 a m	29	5 11	8 2 3	W	1 rain
	7 p m	29	5 12	4 1 6	W	2 fair
25	9 a m	29	4 12	2 2 1	S by W	2 fair
	7 p m	29	2 13	4 1 9	S by W	2 cloudy
26	9 a m	29	2 13	3 1 7	S by W	2 fair
	7 p m	29	4 13	4 1 7	N E	2 cloudy
27	9 a m	29	8 11	5 1 8	W	1 cloudy
	7 p m	29	9 13	4 1 6	W	1 fair
28	9 a m	29	9 13	3 1 9	S W	1 cloudy
	7 p m	29	6 14	6 1 9	S W	2 rain
29	9 a m	29	9 12	5 1 7	W	2 fair
	7 p m	29	9 12	8 1 5	W	2 fair
30	9 a m	29	6 12	6 2 1	W	2 fair
	7 p m	29	8 12	6 1 5	W by N	2 cloudy
31	9 a m	29	8 12	4 1 7	W	2 cloudy
	7 p m	29	8 12	5 1 8	W	2 cloudy

Gr. height 30 3 17 0 3 0

L. height 29 2 11 5 1 4

H. at a med. 29 8 13 8 1 9

SEPTEMBER 1735:

D.	Hour.	Baro. In D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather
19	a m 28	9 13	3 1	9	W	2 fair
	7 p m 29	2 12	0 1	9	W	2 fair
29	a m 29	4 12	7 1	8	W	3 fair
	7 p m 28	9 11	8 1	2	W	3 rain
39	a m 28	9 11	8 1	7	W	3 fair
	6 p m 28	9 12	3 1	6	S W	3 fair
49	a m 29	3 12	7 1	5	N W	3 fair
	5 p m 29	5 13	0 1	5	N W	2 fair
59	a m 29	6 12	9 2	3	W	1 cloudy
	5 p m 29	7 12	8 2	1	W	1 fair
69	a m 29	8 12	8 1	9	S E	2 cloudy
	5 p m 29	7 12	7 1	7	W	1 fair
79	a m 29	8 13	5 2	4	W	2 fair
	5 p m 29	9 12	7 1	6	W	2 fair
89	a m 29	9 12	5 1	9	S W	2 cloudy
	5 p m 29	8 13	1 1	8	S W	1 cloudy
99	a m 29	6 11	3 2	3	N E	2 rain
	5 p m 29	7 11	3 1	7	N	2 fair
109	a m 29	8 11	6 1	6	N W	2 fair
	5 p m 30	0 11	2 1	5	N W	2 fair
119	a m 30	0 11	6 1	6	N W	1 cloudy
	5 p m 30	0 12	5 1	7	W by S	1 cloudy
129	a m 30	0 12	3 1	8	S W	1 cloudy
	5 p m 30	0 13	2 1	5	S W	1 cloudy
139	a m 30	0 12	3 1	8	W	1 fair
	7 p m 29	9 12	5 1	6	W	1 cloudy
149	a m 29	8 11	7 1	9	S W	2 fair
	5 p m 29	8 12	4 1	5	N W	2 fair
159	a m 29	8 12	1 1	8	W	2 cloudy
	5 p m 29	8 12	8 1	9	W	cloudy
169	a m 29	8 11	1 2	0	W	1 fair
	6 p m 29	9 12	1 1	7	W	1 fair

# AND OBSERVATIONS. 9

## SEPTEMBER 1735.

D.	Hour.	Baro. In D.	Ther. In. D.	Hyg. I. D.	Wind: Dir. For.	Weather.
17	9 a m	29 9	12 8	1 8	S	2 cloudy
	p m	29 9	14 4	1 7	S W	2 fair
18	9 a m	30 0	13 8	1 9	S W	3 fair
	5 p m	30 0	14 1	1 7	S W	2 cloudy
19	9 a m	30 0	12 5	1 9	W	1 cloudy
	5 p m	29 9	11 3	2 8	W	1 cloudy
20	9 a m	29 7	11 8	2 9	S W	1 fair
	5 p m	29 6	12 0	2 8	S W	1 cloudy
21	9 a m	29 4	11 9	2 0	S W	1 fair
	5 p m	29 2	11 9	1 8	S W	1 fair
22	9 a m	28 7	10 7	1 9	W	3 rain
	5 p m	28 8	11 9	1 9	W	2 cloudy
23	9 a m	29 4	11 2	1 7	N W	2 fair
	5 p m	29 5	11 8	1 7	W	1 rain
24	9 a m	29 3	11 5	2 2	N W	1 fair
	4 p m	29 3	12 2	1 9	N	1 cloudy
25	9 a m	29 7	10 7	2 0	N	2 fair
	5 p m	29 9	11 1	1 6	N	2 fair
26	9 a m	30 0	10 1	1 7	W by N	2 cloudy
	4 p m	29 9	11 0	1 8	W	2 cloudy
27	9 a m	29 8	12 0	2 6	N E	1 cloudy
	5 p m	29 8	11 8	1 9	E by N	1 cloudy
28	9 a m	29 7	11 6	1 9	E	1 fair
	4 p m	29 7	12 2	1 7	E	1 fair
29	9 a m	29 7	11 6	1 8	W	2 cloudy
	5 p m	29 7	10 0	1 8	S W	2 cloudy
30	9 a m	29 3	9 9	2 2	S W	3 rain
	4 p m	29 3	10 6	2 0	S W	1 cloudy

Gr. height 30 0 14 4 2 9

L. height 28 7 9 9 1 2

Hata med. 29 6 12 0 1 8

## 10 MEDICAL ESSAYS

OCTOBER 1735.

D.	Hour.	Baro. In. D.	Ther. In. D.	Hyg. I. D.	Wind. Dir. For.	Weather.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11	9 a m 29	6 11	3 2	6	E	2 cloudy
	5 p m 29	7 11	1 2	1	E	2 cloudy
12	9 a m 29	8 10	4 2	4	SE	1 fair
	5 p m 29	9 10	8 2	1	SE	2 cloudy
13	9 a m 30	0 10	2 2	2	E	2 cloudy
	5 p m 30	0 11	2 2	2	E	2 cloudy
14	9 a m 30	1 10	8 2	3	SE	2 cloudy
	5 p m 30	1 10	7 1	9	SE	2 cloudy
15	9 a m 29	8 10	4 2	3	SE	2 rain
	5 p m 29	7 10	7 2	3	SE	2 cloudy
16	9 a m 29	8 11	6 2	4	SE	1 cloudy
	5 p m 29	8 11	3 1	7	SW	1 cloudy

# AND OBSERVATIONS.

OCTOBER 1735.

D.	Hour.	Baro. In. D.	Ther. In. D.	Hyg. l. D.	Wind. Dir. For.	Weather.
17	9 a m	29	9 12	0 2	4 S W	2 cloudy
	5 p m	30	1 12	3 2	4 S W	2 cloudy
18	9 a m	30	2 11	2 2	6 S E	1 fair
	5 p m	30	3 11	5 2	4 S E	2 cloudy
19	9 a m	30	3 11	5 2	5 E by S	0 cloudy
	5 p m	30	3 11	2 2	3 E by S	1 cloudy
20	9 a m	30	3 9	8 2	3 E by S	1 fair
	5 p m	30	2 10	6 2	2 E by S	1 fair
21	9 a m	30	0 10	5 2	3 S E	1 cloudy
	5 p m	29	9 11	0 2	2 S E	1 cloudy
22	9 a m	29	8 11	6 2	6 S	1 fair
	5 p m	29	8 12	6 2	5 S W	1 cloudy
23	9 a m	30	0 12	6 2	7 N	2 cloudy
	5 p m	30	0 12	2 2	6 N	2 cloudy
24	9 a m	30	1 11	8 3	1 E	2 cloudy
	5 p m	30	1 12	0 2	7 E	1 cloudy
25	9 a m	29	9 11	9 2	8 E	0 fog
	4 p m	29	9 12	0 2	0 E	0 fog
26	9 a m	29	4 12	6 2	8 S W	2 cloudy
	4 p m	29	3 12	7 2	7 W	2 cloudy
27	9 a m	29	5 10	0 2	2 W	2 fair
	4 p m	29	5 10	2 1	8 W by N	2 fair
28	9 a m	29	6 8	5 2	0 W by N	2 fair
	4 p m	29	6 9	4 1	6 W by N	2 fair
29	9 a m	29	8 8	1 1	8 N W	2 fair
	4 p m	29	8 9	0 1	5 N W	2 fair
30	9 a m	30	1 8	5 1	8 W	1 fair
	4 p m	30	1 9	5 1	7 W	1 cloudy
31	9 a m	30	1 9	6 2	2 W	1 cloudy
	4 p m	29	9 10	0 2	0 W	2 cloudy

Gr. height 30 3 12 7 3 1

L. height 29 3 8 1 1 5

H. at a med. 29 9 10 8 2 2

NOVEMBER 1735.

D.	Hour.	Baro.		Ther.		Hyg.		Wind.		Weather.
		In.	D.	In.	D.	I.	D.	Dir.	For.	
1	9 a m	29	7	10	3	2	6	N W		2 fair
	4 p m	29	7	10	4	2	4	N W		0 cloudy
2	9 a m	30	0	9	7	2	4	S E		0 cloudy
	4 p m	30	0	10	2	2		S E		0 cloudy
3	9 a m	30	0	10	0	2		W		0 cloudy
	4 p m	30	0	10	2			W		0 cloudy
4	9 a m	29	9	10	1			S E		0 cloudy
	4 p m	29	9	9	7	2	1	S E		0 fair
5	9 a m	29	8	10	2	2	0	S E		0 fair
	4 p m	29	7	11	3	2	3	S		2 cloudy
6	9 a m	30	0	10	0	2		W		0 fair
	4 p m	30	0	10	5	2	5	W		0 fair
7	9 a m	29	8	9	6	2	3	S E		3 cloudy
	4 p m	29	8	10	3	2	2	S E		2 cloudy
8	9 a m	29	7	10	5	2	4	S by E		2 cloudy
	4 p m	29	6	10	6	2	3	S by E		2 cloudy
9	9 a m	29	4	11	6	2	2	S by E		2 cloudy
	4 p m	29	3	11	5	2	2	S by E		2 cloudy
10	9 a m	29	5	10	6	2	1	S		1 fair
	4 p m	29	6	10	9	2	1	S W		2 fair
11	9 a m	29	8	9	6	2	4	S by E		2 cloudy
	4 p m	30	0	10	4	2	5	S by E		2 cloudy
12	9 a m	29	8	10	5	2	1	S		3 cloudy
	4 p m	29	7	11	7	2	1	S		3 cloudy
13	9 a m	29	9	10	3	2	2	S		1 fair
	4 p m	29	9	10	5	2	2	W		2 fair
14	9 a m	29	5	12	1	2	3	W		2 cloudy
	4 p m	29	7	10	6	2	2	S W		2 cloudy
15	9 a m	29	6	11	0	2	1	S		3 cloudy
	4 p m	29	3	12	0	2	2	S		4 cloudy
16	9 a m	29	3	11	5	2	3	S W		2 fair
	4 p m	29	3	11	6	2	1	S W		2 fair

## NOVEMBER 1735.

D.	Hour.	Baro.		Ther.		Hyg.		Wind.		Weather.
		In	D.	In	D.	I.	D.	Dir.	For.	
17	9 a m	29	4	10	4	2	4	W	2	fair
	4 p m	29	5	11	0	2	2	W	2	cloudy
18	9 a m	29	2	10	4	3	4	W	1	cloudy
	4 p m	29	2	11	3	2	9	S	2	cloudy
19	9 a m	29	3	11	8	3	0	S	0	cloudy
	4 p m	29	4	11	7	3	0	S E	1	fog
20	9 a m	29	6	10	7	2	9	by W	1	cloudy
	4 p m	29	6	11	6	2	7	S W	1	cloudy
21	9 a m	29	5	11	6	2	7	S E	2	cloudy
	4 p m	29	4	11	1	2	1	S by E	2	cloudy
22	9 a m	29	5	10	7	2	6	S	2	fair
	4 p m	29	5	10	8	2	6	S	2	fair
23	9 a m	29	5	9	5	2	6	S E	2	fair
	4 p m	29	2	10	5	2	3	S E	2	cloudy
24	9 a m	29	3	10	1	2	5	S	3	cloudy
	4 p m	29	1	10	4	2	6	W	2	cloudy
25	9 a m	29	0	9	1	2	6	N W	0	cloudy
	4 p m	29	1	9	4	2	6	N W	0	cloudy
26	9 a m	29	3	7	7	2	7	W by N	0	fair
	4 p m	29	2	8	1	2	8	N W	0	fair
27	9 a m	28	8	10	0	3	0	S E	0	fog
	4 p m	28	8	10	0	3	3	S E	2	fair
28	9 a m	29	6	10	7	3	9	N E	2	rain
	4 p m	29	2	10	5	4	0	N E	1	rain
29	9 a m	29	7	10	2	4	1	N	0	cloudy
	4 p m	29	7	9	9	4	0	N	0	cloudy
30	9 a m	29	7	10	0	3	6	W	1	fair
	4 p m	29	7	10	0	3	3	W	1	fair
Gr. height 30		0	12	1	4					
L. height 28		8	7	7	2	0				
Hat a medi. 29		5	10	5	2	5				

DECEMBER 1735.

D.	Hour.	Baro.		Ther.		Hyg.		Wind.		Weather.
		In.	D.	In.	D.	I.	D.	Dir.	For.	
1	9 a m	29	6	10	0	3	3	SE	0	rain
	4 p m	29	5	10	2	3	5	SE	0	cloudy
2	9 a m	29	6	10	3	3	6	SE	0	cloudy
	4 p m	29	5	10	8	3	6	SE	0	cloudy
3	9 a m	29	3	11	5	3	2	SW	2	variable
	4 p m	29	3	11	4	3	0	SW	2	cloudy
4	9 a m	29	1	11	2	3	1	S	2	cloudy
	4 p m	29	0	11	5	3	0	S	2	cloudy
5	9 a m	29	0	9	4	3	0	N by W	2	cloudy
	4 p m	29	1	9	5	2	6	N by W	2	cloudy
6	9 a m	29	7	8	0	2	3	N by W	2	fair
	4 p m	29	8	7	9	2	3	NW	2	fair
7	9 a m	30	0	7	7	2	3	NW	2	cloudy
	4 p m	29	9	8	3	2	4	NW	2	cloudy
8	9 a m	29	7	8	9	2	0	NE	2	rain
	4 p m	29	6	9	0	3	0	NE	1	rain
9	9 a m	29	6	9	9	3	8	E by N	2	cloudy
	4 p m	29	7	9	8	3	6	NE	2	cloudy
10	9 a m	30	1	8	7	2	7	NE	2	cloudy
	4 p m	30	1	8	8	2	7	NE	2	fair
11	9 a m	30	2	8	1	2	7	NE	1	fair
	4 p m	30	2	8	2	2	6	NE	1	fair
12	9 a m	30	2	8	4	2	5	W	2	cloudy
	4 p m	30	2	8	3	2	2	W	2	cloudy
13	9 a m	30	1	8	6	2	6	W	1	cloudy
	4 p m	30	1	8	8	2	5	W	1	cloudy
14	9 a m	30	1	9	0	2	7	SE	0	cloudy
	4 p m	30	1	9	4	2	9	SE	0	cloudy
15	9 a m	30	1	8	5	2	8	W	1	cloudy
	4 p m	30	0	8	9	2	7	W	2	cloudy
16	9 a m	29	7	10	5	2	9	W	2	cloudy
	4 p m	29	5	10	9	3	0	W	2	cloudy

DECEMBER 1735.

B.	Hour.	Baro. In D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather.
17	9 a m	29 6	10 0	2 9	W	2 fair
	4 p m	29 6	10 5	3 0	W	2 hazy
18	9 a m	29 7	9 5	2 7	W	0 cloudy
	4 p m	29 8	10 0	3 0	W	0 fair
19	9 a m	29 8	10 4	3 1	W	2 cloudy
	4 p m	29 8	10 5	3 2	W	2 cloudy
20	9 a m	29 8	10 3	3 0	N W	2 fair
	4 p m	29 8	10 3	2 7	N W	2 cloudy
21	9 a m	30 1	9 5	2 6	N W	0 cloudy
	4 p m	30 1	9 4	2 6	W	0 cloudy
22	9 a m	30 1	9 8	2 6	S	2 cloudy
	4 p m	30 0	10 0	2 5	S	2 cloudy
23	9 a m	30 0	8 2	2 5	S	2 fair
	4 p m	30 0	8 1	2 4	S	1 fair
24	9 a m	29 7	7 5	2 2	S	2 fair
	4 p m	29 7	9 2	2 3	S	3 cloudy
25	9 a m	29 4	10 7	2 6	S	2 cloudy
	4 p m	29 5	11 0	2 7	S	2 hazy
26	9 a m	29 6	10 5	3 0	S by E	0 hazy
	4 p m	29 6	11 4	3 0	S by E	1 hazy
27	9 a m	29 5	10 2	2 8	S by E	0 fair
	4 p m	29 4	10 7	2 7	S by E	0 fair
28	9 a m	29 0	11 3	2 5	S	3 fair
	4 p m	29 1	10 7	2 3	S	2 drizzling
29	9 a m	29 3	10 0	2 4	S	3 fair
	4 p m	29 4	10 3	2 4	S	3 fair
30	9 a m	29 6	9 4	2 5	S	2 fair
	4 p m	29 6	9 8	2 4	S	2 fair
31	9 a m	29 6	8 7	2 5	S	2 fair
	4 p m	29 5	10 0	2 5	S E	2 cloudy
Gr. height		30 2	11 5	3 8		
L. height		29 0	7 5	2 2		
Hat a med.		29 7	9 6	2 7		

JANUARY 1736.

D.	Hour.	Baro. In. D.	Ther. In. D.	Hyg. I. D.	Wind. Dir. For.	Weather.
1	9 a m	29	5 10	2 2	5 S E	3 cloudy
	4 p m	29	5 10	0 2	6 S E	2 hazy
2	9 a m	29	5 10	0 2	8 S E	2 fair
	4 p m	29	5 10	3 2	7 S E	2 cloudy
3	9 a m	29	4 9	8 2	6 S by E	1 cloudy
	4 p m	29	1 10	3 2	5 S by E	1 cloudy
4	9 a m	29	1 11	5 2	7 S	2 hazy
	4 p m	29	1 11	7 2	6 S	3 cloudy
5	9 a m	29	6 9	4 2	4 S by W	2 fair
	4 p m	29	6 10	4 2	4 S by W	3 rain
6	9 a m	29	6 10	1 2	6 S W	3 cloudy
	4 p m	29	6 10	7 2	3 S W	2 cloudy
7	9 a m	29	7 10	8 2	3 W	2 fair
	4 p m	29	7 10	9 2	3 S W	1 cloudy
8	9 a m	29	7 10	2 2	5 S by E	2 cloudy
	4 p m	29	6 9	9 2	5 S by E	2 cloudy
9	9 a m	29	5 10	0 2	4 S W	2 cloudy
	4 p m	29	5 10	5 2	5 S W	1 rain
10	9 a m	29	3 9	4 2	4 S	2 fair
	4 p m	29	1 10	8 2	3 S W	2 fair
11	9 a m	29	0 9	0 2	4 S W	2 fair
	4 p m	29	0 9	0 2	3 S W	2 fair
12	9 a m	29	3 8	6 2	4 S	2 fair
	4 p m	29	3 9	3 2	4 S	2 fair
13	9 a m	29	2 9	7 2	5 S by E	2 cloudy
	4 p m	29	1 10	3 2	4 S by E	2 cloudy
14	9 a m	28	9 8	9 2	5 S W	2 cloudy
	4 p m	28	9 9	0 2	5 S W	2 fair
15	9 a m	29	0 8	4 2	6 W	2 fair
	4 p m	29	0 8	5 2	6 W	2 fair
16	9 a m	29	1 7	4 2	9 W	2 fair
	4 p m	29	1 8	1 3	0 W	2 cloudy

# AND OBSERVATIONS. 17

JANUARY 1736.

D.	Hour.	Baro. In. D.	Ther. In. D.	Hyg. I. D.	Wind. Dir. For.	Weather.
17	9 a m	29	2 7	42	9 S	0 fair
	4 p m	29	3 8	02	9 S	0 fair
18	9 a m	29	4 8	43	0 S	0 cloudy
	4 p m	29	3 9	02	9 S	0 cloudy
19	9 a m	29	2 9	32	9 S by W	1 fair
	5 p m	29	2 9	22	4 S by W	3 cloudy
20	9 a m	29	3 8	91	4 S by W	2 fair
	5 p m	29	3 9	32	4 S W	0 cloudy
21	9 a m	29	3 7	62	5 W	2 fair
	5 p m	29	3 8	92	4 W	1 fair
22	9 a m	29	4 8	82	7 N	2 hazy
	5 p m	29	6 8	32	3 N	2 cloudy
23	9 a m	29	6 7	32	4 N	2 fair
	5 p m	29	6 7	92	3 N E	2 fair
24	9 a m	29	4 8	52	3 S by E	2 cloudy
	5 p m	29	2 8	72	5 S by E	2 cloudy
25	9 a m	29	9 8	72	8 S W	2 fair
	5 p m	28	9 9	02	5 S W	2 fair
26	9 a m	28	9 8	42	7 W	1 snow
	5 p m	28	9 8	82	5 W	1 fair
27	9 a m	29	1 9	22	4 S by E	0 cloudy
	5 p m	29	2 9	52	4 S by E	0 fair
28	9 a m	29	4 9	52	6 S E	2 cloudy
	5 p m	29	4 9	52	5 S E	2 cloudy
29	9 a m	29	6 8	82	7 W	2 cloudy
	5 p m	29	6 8	62	9 W	2 cloudy
30	9 a m	29	6 7	83	0 E	1 fog
	5 p m	29	6 9	02	9 S E	1 fair
31	9 a m	29	4 8	62	9 S E	0 fog
	5 p m	29	4 8	82	9 S E	0 fog

Gr. height 29 7 11 73 0

L. height 28 9 7 3 4

H. atamed. 29 3 9 22 5

FEBRUARY 1736.

D	Hour.	Baro. In. D.	Ther. In. D.	Hyg. I D.	Wind. Dir. For.	Weather.
1	9 a m	29 5	8 7	2 8	S	0 fair
	5 p m	29 4	9 1	2 6	S	2 cloudy
2	9 a m	28 5	9 7	2 7	W by S	2 cloudy
	5 p m	28 5	9 8	2 5	W by S	1 cloudy
3	9 a m	29 1	8 6	3 0	W	2 fair
	5 p m	29 2	9 2	2 7	W	0 fair
4	9 a m	29 1	8 7	2 9	NE	2 cloudy
	5 p m	29 2	9 5	2 8	NE	2 cloudy
5	9 a m	29 4	9 2	3 1	NE	2 cloudy
	5 p m	29 3	9 0	3 0	E	2 cloudy
6	9 a m	29 4	8 8	2 8	SE	2 cloudy
	5 p m	29 4	9 1	2 7	SE	2 cloudy
7	9 a m	29 5	8 6	2 7	SE	1 fair
	5 p m	29 4	8 6	2 4	SE	2 fair
8	9 a m	29 4	7 8	2 4	SE	3 cloudy
	5 p m	29 3	7 9	2 3	SE	3 snow
9	9 a m	29 3	8 0	2 5	SE	2 cloudy
	5 p m	29 3	8 0	2 4	SE	2 cloudy
10	9 a m	29 4	8 0	2 4	SE	2 cloudy
	5 p m	29 5	8 0	2 0	SE	2 cloudy
11	9 a m	29 7	7 7	2 0	NE	2 fair
	5 p m	29 8	7 2	2 0	NW	2 fair
12	9 a m	30 0	7 9	2 0	N	2 fair
	5 p m	30 0	8 0	2 0	N	2 fair
13	9 a m	29 9	8 6	2 4	W	0 cloudy
	5 p m	29 8	9 1	2 3	W	0 cloudy
14	9 a m	29 7	9 6	2 5	NE	2 fair
	5 p m	29 7	9 4	2 3	NE	2 fair
15	9 a m	29 4	9 5	2 6	NW	2 cloudy
	5 p m	29 3	10 1	2 1	W by N	2 fair
16	9 a m	29 4	6 8	2 0	NW	3 fair
	5 p m	29 5	6 3	2 0	NW	3 fair

# AND OBSERVATIONS.

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## FEBRUARY 1736.

D.	Hour.	Baro. In. D.	Ther In. D.	Hyg. I. D.	Wind, Dir. For.	Weather.
17	9 a m	29 4	8 2	2 1	N W	2 cloudy
	5 p m	29 4	8 7	2 1	N W	2 cloudy
18	9 a m	29 6	8 2	2 4	N W	0 snow
	5 p m	29 6	8 6	2 3	N W	1 fair
19	9 a m	29 5	8 1	2 2	E	2 fair
	5 p m	29 6	8 4	2 1	E	2 fair
20	9 a m	29 5	6 9	2 4	E	1 fair
	5 p m	29 4	7 7	2 0	E	1 fair
21	9 a m	29 2	8 4	2 0	E by S	2 fair
	5 p m	29 2	8 4	1 8	E	3 cloudy
22	9 a m	29 1	8 3	2 1	N E	3 snow
	5 p m	29 0	7 8	2 9	N E	3 snow
23	9 a m	29 2	7 6	3 2	N	2 cloudy
	5 p m	29 2	7 9	2 7	N	2 fair
24	9 a m	29 5	7 1	2 7	N by W	1 fair
	5 p m	29 5	8 3	2 4	N by W	1 fair
25	9 a m	29 6	7 9	2 6	W	1 cloudy
	5 p m	29 6	8 9	2 3	N W	2 fair
26	9 a m	29 8	8 7	2 3	N W	0 fair
	5 p m	29 7	8 7	2 3	S E	1 cloudy
27	9 a m	29 6	9 2	2 6	S W	0 cloudy
	5 p m	29 6	10 3	2 6	S W	2 cloudy
28	9 a m	29 7	10 0	2 7	W	2 cloudy
	5 p m	29 7	9 6	2 4	N	2 cloudy
29	9 a m	30 1	8 6	2 3	N W	2 fair
	5 p m	30 1	9 5	2 0	N W	2 cloudy
Gr. height		30 1	10 3	3 2		
L. height		29 0	6 3	1 8		
H. at a med.		29 4	8 5	2 4		

MARCH 1736.

D.	Hour	Baro. In D.	Ther. In D.	Hyg. L. D.	Wind. Dir. For.	Weather.
1	9 a m	30	29	32	NE	3 cloudy
	6 p m	30	29	52	NE	3 cloudy
2	9 a m	30	29	22	NE	2 cloudy
	6 p m	30	29	42	NE	2 cloudy
3	9 a m	30	18	92	E	2 fair
	6 p m	30	18	82	NE	2 fair
4	9 a m	29	9	52	NW	2 cloudy
	6 p m	29	10	62	NW	2 cloudy
5	9 a m	29	5	02	W	2 fair
	6 p m	29	2	104	SW	1 rain
6	9 a m	29	0	92	SW	2 fair
	6 p m	28	9	92	SW	2 fair
7	9 a m	28	9	92	NW	2 fair
	6 p m	29	1	90	NW	2 fair
8	9 a m	29	4	8	W	2 fair
	6 p m	29	4	8	W	2 fair
9	9 a m	29	4	9	W by N	2 fair
	6 p m	29	5	10	W by N	2 fair
10	9 a m	29	7	9	SW	2 fair
	6 p m	29	7	11	SW	2 fair
11	9 a m	29	6	11	S by W	4 fair
	6 p m	29	6	11	S by W	3 fair
12	9 a m	29	9	12	SW	1 cloudy
	6 p m	30	0	12	W	2 fair
13	9 a m	30	0	11	S	2 fair
	6 p m	30	0	11	W	2 fair
14	9 a m	30	0	11	NW	1 cloudy
	6 p m	30	0	12	NW	1 fair
15	9 a m	30	0	10	E	1 fog
	6 p m	30	1	9	E	2 fog
16	9 a m	30	1	10	E	1 fog
	6 p m	30	0	11	SE	2 fair

MARCH 1736.

D.	Hour.	Baro. In D.	Ther. In D.	Hyg. t. D.	Wind. Dir. For.	Weather.
17	9 a m	30	0 10	5 2	5 S E	2 cloudy
	6 p m	30	0 11	3 1	9 S E	2 fair
18	9 a m	30	0 9	1 2	1 S E	2 fair
	6 p m	29	9 10	6 1	8 S E	2 fair
19	9 a m	29	6 9	5 2	0 S E	3 fair
	6 p m	29	5 10	1 1	9 S E	2 cloudy
20	9 a m	29	4 9	7 2	5 E	2 rain
	6 p m	29	9 9	8 2	6 E	2 rain
21	9 a m	29	4 10	0 2	5 S E	2 cloudy
	6 p m	29	4 10	7 2	4 S E	2 cloudy
22	9 a m	29	3 10	5 2	6 S E	2 rain
	6 p m	29	2 11	3 1	9 S E	2 cloudy
23	9 a m	29	1 10	1 2	9 E	2 fog
	6 p m	29	1 9	8 3	2 E	2 fog
24	9 a m	29	1 10	3 3	4 E	2 fog
	4 p m	29	1 10	9 3	0 E	1 fair
25	9 a m	29	3 11	5 3	0 N E	0 cloudy
	6 p m	29	4 12	2 2	0 W	1 fair
26	9 a m	29	4 10	9 2	2 S W	0 cloudy
	6 p m	29	4 12	0 2	3 S by W	0 cloudy
27	9 a m	29	6 10	6 2	5 S by E	1 fog
	6 p m	29	5 11	4 2	5 S E	1 cloudy
28	9 a m	29	4 11	9 2	7 S E	2 rain
	6 p m	29	5 14	7 2	0 S E	2 fair
29	9 a m	29	6 10	6 3	1 E	2 fog
	6 p m	29	5 11	1 3	1 E	2 rain
30	9 a m	29	6 11	7 3	0 S W	1 cloudy
	6 p m	29	7 12	3 2	1 S W	0 cloudy
31	9 a m	29	8 11	6 2	5 W	2 fair
	6 p m	29	9 11	3 1	9 W	2 fair

Gr. height 30 2 14 1 7 3 4

L. height 28 9 8 5 1 6

H. at a med. 29 6 10 5 2 2

APRIL 1736.

D.	Hour.	Baro. In. D.	Ther. In. D.	Hyg. L. D.	Wind. Dir. For.	Weather.
1	9 a m	29	8 11	4 2	6 NE	0 fog
	6 p m	29	9 11	6 2	7 NE	0 fog
2	9 a m	29	9 11	0 3	1 NE	1 fog
	6 p m	29	9 11	3 2	9 NE	1 cloudy
3	9 a m	30	2 12	2 3	0 NE	0 fair
	6 p m	30	2 13	0 2	5 NE	0 fair
4	9 a m	30	3 12	9 2	3 S W	0 fair
	6 p m	30	3 13	4 1	9 S W	2 fair
5	9 a m	30	0 12	3 2	0 S W	2 fair
	6 p m	30	1 11	6 1	8 NE	2 fair
6	9 a m	30	2 11	3 1	7 N W	2 fair
	6 p m	30	2 12	2 1	6 N W	2 fair
7	9 a m	30	2 10	8 1	8 W	2 fair
	6 p m	30	0 10	2 1	3 W by N	2 fair
8	9 a m	29	9 11	9 2	1 W by N	2 fair
	6 p m	29	7 11	5 1	9 W by N	2 fair
9	9 a m	29	6 9	1 2	5 N W	2 snow
	6 p m	29	9 9	2 2	3 N W	3 cloudy
10	9 a m	30	0 9	1 1	6 N W	2 cloudy
	7 p m	30	0 9	7 1	5 W by N	2 cloudy
11	9 a m	29	7 10	8 2	0 W	2 fair
	7 p m	29	8 10	4 1	8 NE	2 rain
12	9 a m	29	7 9	5 2	9 NE	2 cloudy
	7 p m	29	7 8	7 2	7 NE	2 cloudy
13	9 a m	30	0 8	5 2	2 N W	2 fair
	7 p m	30	0 9	8 1	7 N W	2 fair
14	9 a m	29	6 10	0 1	8 S	4 cloudy
	7 p m	29	2 11	2 1	9 S	3 cloudy
15	9 a m	28	9 10	5 2	5 W by N	2 rain
	7 p m	29	0 10	5 2	0 W by N	2 cloudy
16	9 a m	29	3 10	4 2	9 N by W	2 cloudy
	7 p m	29	4 10	3 2	2 N by W	2 cloudy

. APRIL 1736.

H.	Hour	Baro.		Ther.		Hyg.		Wind.		Weather.
		M D.	ln. D.	M. D.	I. D.	I. D.	I. D.	Dir.	For.	
17	9 a m	29	5 10	0 2	0	0	0	N W	2	cloudy
	7 p m	29	6 10	5 1	8	0	0	N W	2	fair
18	9 a m	29	6 10	4 2	0	0	0	W	2	fair
	7 p m	29	6 10	3 1	6	0	0	N W	2	cloudy
19	9 a m	29	6 10	2 2	0	0	0	W by N	2	fair
	7 p m	29	6 10	0 1	8	0	0	W by N	2	fair
20	9 a m	29	7 11	5 1	9	0	0	W	2	cloudy
	7 p m	29	7 12	2 1	5	0	0	W	0	fair
21	9 a m	29	8 11	5 1	8	0	0	S	0	fair
	7 p m	29	8 12	2 1	7	0	0	S E	2	fair
22	9 a m	29	9 11	8 1	8	0	0	S E	0	rain
	7 p m	29	8 13	0 1	8	0	0	S	2	cloudy
23	9 a m	29	8 13	4 2	0	0	0	S	1	rain
	7 p m	30	0 13	6 2	0	0	0	S	1	cloudy
24	9 a m	30	1 14	3 2	0	0	0	S E	1	fair
	7 p m	30	0 14	5 1	5	0	0	S E	2	fair
25	9 a m	30	0 12	0 2	0	0	0	S E	2	fair
	7 p m	29	9 12	7 1	8	0	0	S E	2	fair
26	9 a m	29	7 13	0 1	9	0	0	S W	2	cloudy
	7 p m	29	8 13	7 1	4	0	0	S	2	fair
27	9 a m	29	9 13	5 1	6	0	0	S	3	cloudy
	7 p m	29	9 13	3 1	7	0	0	S	3	cloudy
28	9 a m	30	1 13	9 1	9	0	0	W	2	fair
	7 p m	30	1 14	2 1	5	0	0	W	1	cloudy
29	9 a m	30	2 13	6 1	8	0	0	N W	2	cloudy
	7 p m	30	3 13	9 1	3	0	0	N W	2	fair
30	9 a m	30	2 10	6 1	9	0	0	N E	2	cloudy
	7 p m	30	2 10	1 1	5	0	0	N E	2	cloudy

Gr. height 30 3 14 5 3 8

L. height 28 9 8 5 1 3

H. at a med. 29 8 11 5 1 9

MAY 1736.

D.	Hour.	Baro. In D.	Ther. In D.	Hyg. I. D.	Wind. Dir. For.	Weather.
1	9 a m	30	2 10	2 1	3 N W	2 cloudy
	7 p m	30	1 10	4 1	2 N by W	2 fair
2	9 a m	30	0 10	9 1	4 N by W	2 cloudy
	7 p m	30	0 10	6 1	3 N by W	2 fair
3	9 a m	29	9 10	4 1	3 N W	2 fair
	7 p m	29	8 12	2 1	1 N W	2 fair
4	9 a m	29	8 10	3 1	4 N W	2 cloudy
	7 p m	29	8 10	8 1	5 N E	2 cloudy
5	9 a m	30	0 11	5 1	5 N E	2 cloudy
	7 p m	30	0 11	4 1	4 N E	2 cloudy
6	9 a m	30	0 11	3 1	5 N E	2 fair
	7 p m	29	9 10	4 1	3 N E	2 cloudy
7	9 a m	29	9 12	0 1	5 N E	2 fog
	7 p m	29	8 11	5 1	4 N E	2 fair
8	9 a m	29	7 11	8 1	3 N E	2 fair
9	9 a m	29	7 11	0 1	5 N E	2 fair
	7 p m	29	8 10	7 1	4 N E	2 fair
10	9 a m	29	8 10	9 1	7 N E	2 fair
	7 p m	29	8 10	7 1	8 N E	2 fair
11	9 a m	29	8 10	0 2	0 N E	2 rain
	7 p m	29	7 10	8 1	7 N E	2 cloudy
12	9 a m	29	6 11	1 1	6 N E	2 rain
	7 p m	29	6 10	8 1	7 N E	2 fair
13	9 a m	29	7 11	9 1	7 N E	2 cloudy
	7 p m	29	6 10	9 1	8 N E	2 cloudy
14	9 a m	29	6 11	7 2	1 N E	2 fair
	7 p m	29	5 11	6 2	7 E	2 hazy
15	9 a m	29	5 11	5 3	4 E	3 foggy
	7 p m	29	5 11	8 3	2 E	1 rain
16	9 a m	29	6 13	1 1	9 S W	2 fair
	7 p m	29	6 13	8 1	6 S W	2 fair

# AND OBSERVATIONS. 25

MAY 1736.

D	Hour.	Baro. In. D.	Ther. In. D.	Hyg. l. D.	Wind. Dir. For.	Weather.
17	9 a m	29	7 14	7 1	6 S W	2 fair
	7 p m	29	9 13	8 1	5 W	2 fair
18	9 a m	30	1 13	5 1	7 S	2 fair
	7 p m	30	2 14	2 1	6 E	1 fair
19	9 a m	30	2 12	7 2	3 E	2 fair
	7 p m	30	3 13	3 1	8 E by N	2 foggy
20	9 a m	30	3 12	3 2	9 E by N	2 foggy
	7 p m	30	2 13	3 1	6 E by N	2 fair
21	9 a m	30	1 11	8 2	2 E	2 cloudy
	7 p m	30	0 11	5 2	0 E	2 cloudy
22	9 a m	29	9 11	6 1	9 E	2 cloudy
	7 p m	29	8 11	6 1	9 E	2 cloudy
23	9 a m	29	7 12	3 1	9 E	1 foggy
	7 p m	29	6 12	3 2	1 E	2 cloudy
24	9 a m	29	6 13	3 2	1 E	0 cloudy
	7 p m	29	5 13	0 1	5 W	3 cloudy
25	9 a m	29	5 12	2 1	5 W	3 fair
	7 p m	29	5 12	6 1	1 W	3 fair
26	9 a m	29	3 12	6 1	4 S W	2 cloudy
	7 p m	29	3 12	6 1	4 S W	2 cloudy
27	9 a m	29	4 13	2 1	4 E	2 cloudy
	7 p m	29	5 11	7 1	7 S E	2 cloudy
28	9 a m	29	7 12	6 2	0 N E	2 cloudy
	7 p m	29	8 11	9 2	1 N E	2 fair
29	9 a m	29	8 13	1 2	0 N E	2 cloudy
	7 p m	29	8 12	0 3	2 N E	2 foggy
30	9 a m	29	9 12	5 2	4 N E	2 fair
	7 p m	30	0 3	5 1	8 E	2 fair
31	9 a m	30	0 14	2 1	6 N E	2 fair
	7 p m	30	0 4	9 1	5 N E	2 fair
<hr/>						
Gr. height		30	3 14	9 3	2	
L. height		29	3 10	0 1	2	
H. at a med.		29	8 11	8 1	7	

II. *An Account of the DISEASES that were most frequent in Edinburgh from May 1735 to June 1736.*

**A**GUES, which we mentioned to have been common in the spring 1735, did not altogether cease, though they were less frequent, in the summer, and then proved tedious, and were liable to return when the bark was too soon given.

About the 20th of June 1735, the measles appeared here, and soon became very rife; they were very frequent all July and August, decreased afterwards, but did not leave the town altogether till spring 1736. In December they were very universal in the country about Edinburgh. The progress of these measles along the west road of England towards Edinburgh was very remarkable, for they could be traced from village to village; and it was singular, that the first person in Edinburgh who was seized with them was a lady in child-bed, who saw no body but her nurse and a friend who lived in the house with her.

The symptoms preceeding this disease were, a hard dry cough, muddy, moist eyes, irregular short attacks of listlessness and inactivity; the duration of these before the eruptive fever began was very uncertain, in some only one day, in others fourteen, or any intermediate time. The eruptive fever continued one, two, or three days, attended with sneezing, itching in the skin, inflammation of the palate and tonsils, some bled at the nose, others had a diarrhoea.

diarrhoea. The exanthemata were of the common form generally, but in some they rose above the surface of the skin, as high as the mild kind of small-pox are generally in the second day; none of them however suppurated. Upon the eruption, the fever, cough, and angina abated, but did not go off till the decline of the disease. The eruption advanced three, four, or five days, and then began to decline, after which was the time of greatest danger; for then, in several, the cough returned more violent, peripneumony and diarrhoea came on; but, in most patients, the disease declined gradually without bad symptoms, and, in general, the measles were mild and benign during all this season.

Most of the patients, who were attended by our physicians and surgeons, were kept on the cool regimen all the time of the disease; were let blood of, and vomited before the eruption, unless when the preceeding symptoms and fever were very mild. If the belly was costive, clysters were given. If there was a diarrhoea, blood-letting, vomits, and *decoct. alb.* generally put it away. Emollient pectorals and *syrup. diacod.* were of use in making the cough easier. When the defluxion became tough, vinegar, or vinegar of squills, was added to the other medicines. If the angina was violent, emollient detergent gargarisms and poultices were used. When, upon the measles suddenly disappearing, peripneumony, delirium, or stupor were occasioned, the patients whose pulse was high were relieved by being let blood; those

who had a low pulse were blistered, by which the measles were brought out, and the other bad symptoms ceased. In some whose measles suddenly disappeared, and who were freed of the violent symptoms by the methods just now mentioned, the exanthemata did not immediately return, but the patients remained listless several days or weeks, after which the eruption came out again.—If, upon the decline of the disease, the peripneumony came on, blood-letting, when the pulse was high, and blistering, when it was low, were the principal remedies, with the assistance of clysters, laxative purges, and attenuating pectorals. A diarrhoea, coming upon the decline of the measles, seldom did service, but wasted the patients, and was difficult to stop; rhubarb and *mercur. d.* were of most service in removing it.

Some days after the measles were gone, the patients generally got two or three doses of physic.

To those who seemed to be hectic, and to be threatened with a phthisis after this disease, vomits, peruvian bark, and asses milk were of service.

During this measly season, several people, who never had had the measles, had all the preceeding symptoms of measles, which went off in a few days without any eruption, which they underwent months or years afterwards. Others who had undergone the measles formerly, had at this time a fever of the erysipelalous kind, with eruptions like to what nettles cause, and all the previous and concomitant symptoms

symptoms of measles from the beginning to the end of the disease.

In June and July, there were also some pleurifies and slight catarrhs.

In July, several had a slow fever with a low pulse, in which a diarrhoea either began with the fever, or came towards the end of it, or continued all the time of it. The cure depended principally on vomits and blisters.

Cholera and kinkcough were pretty frequent in the country near the town at this time.

In August and September, there were some few people who had coughs, rheumatic fevers, and squincies, which were not epidemical.

In October, November, and December, several had the dysentery, the symptoms and method of treating which were nearly the same as we described in our 4th volume, in the account we gave of this disease, which was in this place about the same season of the preceeding year. Some, after blood-letting and vomiting, gave to their patients small doses of *aquila alb.* once a day, till their breath began to be tainted; the purging being moderated in the mean time by opiates, glutinous food and drink, and anodyne clysters, which were the more necessary that the guts were very easily irritated, so that ten grains of rhubarb scarce durst be given. Notwithstanding the symptoms being violent, this disease was fatal to few.

From the beginning of October 1735, to the beginning of February 1736, a fever was very frequent in town; the sick had generally a low pulse on the first two or three days, with great anxiety and uneasiness, and thin

crude urine; delirium began about the fourth, and continued till the fever went off in the seventh day, and sometimes the disease was lengthened out to the 14th day. The approach of the delirium could always be foretold by the urine becoming more limpid and without sediment. The symptomatic sweats which happened during the progress of this fever did for most part harm, the patients being very uneasy while in them, and weaker after, without any diminution of the fever. In some, these sweats broke the force of the fever, and, returning several times, carried it off at last. A large plentiful sweat was the crisis to several, in others there was no crisis observed. In the greater number, the urine did not let fall a sediment till several days after the fever seemed to be gone; those who had a plentiful sediment in their urine recovered well; others were exposed to relapses, which were very frequent, and rather more dangerous than the former fever.

Blood-letting in the beginning was of advantage, not only to the few who had then a strong pulse, but even to those with a low pulse, which generally became stronger after bleeding, and the sick were considerably relieved from the heavy anxiety they laboured under. The liberal use of blisters was what seemed principally to promote the cure, the critical sweats being also forwarded by diluent drinks and gently stimulating medicines, such as *rad. serpentar. valerian. castor. sal. succin. &c.* Clysters were also given from time to time,

time, to assist the urinary organs, and to empty the intestines.

After this fever was gone off, the sick generally were fatigued with constant watching, which opiates did not remove; but ten grains of a scruple of castor assisted to procure sleep.

Catarrhs, coughs, squincies, rheumatic pains, and slight fevers were to be seen in this winter as well as in most others.

Pleurisies and rheumatic fevers were frequent in February 1736. Blood-letting, blistering, and diluent attenuating drinks were the cure.

In this month of February, a pleurisy that had something uncommon in it was very frequent in Fife, and at first proved fatal to many. It began with shivering, head-ach, trembling, and bilious vomiting, which, after two days, were succeeded by a pungent pain among the short ribs, difficult breathing, and a short cough. If the sick remained in bed, the tongue became white and foul, otherwise it continued moist. The thirst of the sick was moderate if they were not blooded; but, when as much blood was taken as the degree of pain seemed to require, the thirst increased, as did likewise the sickness at the stomach till they fainted. The pulse was neither frequent nor full, and quickly sunk on taking blood, which was of a brownish, yellowish, or greenish colour, and hardly coagulated. Their belly was regular, the spittle tough, white, and mucous; the cheeks were alternately flushed. The sick slept none through the whole course of the disease, which continued from twenty-five to thirty-two days.

When

When blood-letting was let alone, or very sparingly used, and vomits were given early, and afterwards repeated, with aperient expectorating cooling nitrous liquors for drink, and attenuating pectorals when the stomach could bear them, the patients generally recovered. If the emetics were strong, they brought such a quantity of thick phlegm upon the lungs as endangered suffocation.

In March, April, and May, coughs with fever were frequent, which brought several into the danger of a *phthisis pulmonalis*. Bleeding, repeated vomits, blisters on the shoulders, cooling purgatives, and the attenuating pectorals, were the means used to remove them, and generally with success when timely applied.

III. *An Extract from the public Register of Burials in Edinburgh.*

1735.	Men.	Women.	Child.	Still-born.	Sum.
June -	13	22	34	3	72
July - -	14	18	50	9	91
August -	12	26	70	2	110
September	13	28	50	5	96
October	15	19	44	3	81
November	13	27	58	4	102
December	13	21	50	10	94
1736.					
January	28	32	31	0	91
February	26	26	27	3	82
March -	27	33	32	3	95
April - -	25	26	51	5	107
May - -	19	30	43	8	100
Total	218	308	540	55	1121

IV. *A Comparison of the Meteorological Registers and epidemic Diseases at Edinburgh, Rippon, Plymouth, and Norimberg, from May 1731, to June 1736, in a Letter to Mr MONRO, B. A. from Mr PATRICK KER Student of Medicine in the University of Edinburgh.*

S I R,

IN obedience to your commands, I have made an attempt to compare the meteorological register and the account of the epidemic diseases published by the society at Edinburgh, with the Rippon, Plymouth, and Norimberg observations of the same kind, and made in the same period of time, as they are related by Dr Hilary in the appendix to his practical essay on the small-pox, by Dr Huxham in his treatise *De Aere et Morbis Epidemicis*, and in the *Commercium literarium Norimbergense*.

The first art. of vol. 1. Medical Essays gives a very exact account of Edinburgh, I can find no such accurate description of the other places.

Rippon is an inland town in Yorkshire situated  $1^{\circ} 43'$  farther south,  $1^{\circ} 30'$  farther east than Edinburgh, between 80 and 100 miles distant from the German ocean on the one side and the Irish sea on the other.

Plymouth, a sea-port in Devonshire, is  $5^{\circ} 25'$  south of Edinburgh, and  $1^{\circ} 20'$  west of it, situated near the chops of the British channel, which is to the south of it. By the situation therefore of Edinburgh, Rippon, and Plymouth, they would seem to be very proper  
for

for making observations; by comparing which together, some assistance might be got for accounting for the changes in our British atmosphere and bodies.

Norimberg, a large city of Franconia, is about  $6^{\circ}$  south, and  $14^{\circ}$  east of Edinburgh, situated at a great distance from any sea, the nearest not being within 300 miles of it.

By either comparing the heights of the mercury in the barometer at Edinburgh and Norimberg, as they are marked in the registers for the same days, or by calculating the height at a medium of all the observations, it appears that the barometer at Norimberg is placed about 700 feet higher than the one at Edinburgh; so that the people of Norimberg live in an atmosphere which is about  $\frac{1}{37}$  lighter than that of Edinburgh. Dr Huxham tells us, that his barometer stands, since July 1733, at 30 feet above the level of the sea, but formerly it stood at 46, which is about 230 lower than the Edinburgh one.

The heat of the different climates of these places is very difficult to be determined; none of the observations in any of them being accurately calculated for determining the hottest and coldest times of each day; and though I can compare Dr Huxham's thermometer with the Edinburgh one, by the help of Dr Martin's essay towards comparing different thermometers; yet Professor Dopplemaier's thermometer, which is called *Fahrenheitianum maximum*, and with which the Norimberg observations are made, is constructed in such a way, and so little is said of any fixed points in

it, that it is not possible for me to make a just comparison. In it there is only a point of heat called temperate, marked o, from which degrees ascend and descend, of which nothing is determined. I judge that temperate point to answer nearly to the Edinburgh 11 inches, because the greatest degree of heat in summer, and of cold in winter at Edinburgh, raised or depressed the surface of the spirits in the tube to near equal distances from 11 inches, as the liquor in the Norimberg thermometer did from the point o. If I was warranted to suppose the heat and cold of the climates in general nearly the same, what I have now observed would make the comparison easy; but my books, as well as the different latitudes, tell me they have warmer summers and colder winters than we have; and I am more confirmed in it, by observing such a difference between Dr Huxham's observations and theirs, though Plymouth is only about one degree different in latitude from Norimberg.

The moisture of the air in these different places is worse to compare; for the Norimberg gentlemen have no hygroscoical observations, and Dr Huxham's hygroscope has not two fixed points; so that I could only guess at a comparison, by which it appears that Plymouth is more moist than Edinburgh. At Edinburgh, the greatest moisture is when the wind blows from the easterly quarter, and the driest air is with north-west winds. At Plymouth, the east and north-east winds are the driest, and the south-east, south, and south-west, are the most moist.

Neither

Neither Dr Hilary nor the Norimberg society has any measure for rain. By Dr Huxham's observations, compared with those at Edinburgh, it appears, that more rain falls at Plymouth than at Edinburgh. At a medium of four years, the rain of Plymouth is to that at Edinburgh as 30.909 inch to 22.518 inch.

At Edinburgh, the winds are generally from the west, south-west, or north-west, only, in the months of March, April, May, and June, the easterly winds are frequent. At Norimberg, the easterly winds blow oftner in October, November, December, and January, than in any other months of the year; the westerly, southerly, and northerly winds prevailing at other times. The strongest winds both at Edinburgh and Plymouth are generally from the south-west.

Having premised these general remarks, I shall proceed to a comparison of the observations in each month, endeavouring to contract them in the way of tables, using the abbreviations employed in the Edinburgh register, and putting Ed. instead of at Edinburgh, Pl. for Plymouth, Nor. for Norimberg, and V. for wind

June 1731.

Barom.	{ Med. at Ed.	29 5	at Pl.	29 4 $\frac{25}{80}$
	{ G. H.	30 1		30
	{ L. H.	29 1		29 1
Therm.	{ Med.	13 2		15 5
	{ G. H.	16 0		16 0
	{ L. H.	10 6		14 5

Air

*Ed.* to 12. day dry V. S. W. and W. after  
 moist V. E. and N. E.  
*Air* { *Pl.* to 20. d. dry. V. E. and N. after moist  
 V. S. W.  
*Rain.* *Ed.* 2.055. *Pl.* 2.148.

*Bar.* { *Med.* *Ed.* 29 7 *Pl.* 29 5 $\frac{1}{2}$   
 { G. H. 30 0 29 8  
 { L. H. 29 4 29 3  
*Ther.* { *Med.* 14 2 16 0  
 { G. H. 16 2 17 1  
 { L. H. 12 6 14 7  
*Air* { *Ed.* dry V. W. and S. W.  
 { *Pl.* dry - - - variable  
*Rain.* *Ed.* 1.541. *Pl.* 1.300

## August.

*Bar.* { *Med.* *Ed.* 29 7 *Pl.* 29 4 $\frac{1}{2}$   
 { G. H. 30 1 29 9  
 { L. H. 29 4 29 0  
*Ther.* { *Med.* 13 5 16  
 { G. H. 15 7 17  
 { L. H. 11 9 14 4  
*Air* { *Ed.* to 9. d. moist, V. E. to 18 d. dry V. N.  
 W. and W. aft. moist V. E.  
 { *Pl.* dry V. E. aft. moist, V. S. E.  
*Rain.* *Ed.* 1.837. *Pl.* 1.988.

During the months of June, July, and till  
 towards the end of August, at Rippon, the wind  
 was very variable, and the season was in general  
 cool, sometimes intermixed with a good deal  
 of rain for a day or two, and then became  
 more temperate again.

## September.

Bar.	{	Med. Ed.	29 6	Pl.	29 $5\frac{1}{2}$
		G. H.	30 2		30
		L. H.	29 0		29 2
Ther.	{	Med.	12 9		15 5
		G. H.	14 7		15 7
		L. H.	10 7		3 9
Air	{	Ed. dry, V. W. and N. W. or S. W.			
		Pl. dry begin V. S. W. after 11 d. E.			
		Rip. moist V. S.			
Rain, Ed. 2.021 Pl. 1.300					

## October.

Dr Huxham having mentioned neither the height of Barometer nor Thermometer this month, I have no comparison of them at Edinburgh to make with any other.

Air	{	Ed. to 20. dry, V. W. and S. W. to end			
		moist, V. S. and S. E.			
		Pl. to 11. V. W. to 27. S. E. to end S. W.			
Rain,		Ed.	1.479.	Pl.	2.366.

## November.

Bar.	{	Med. Ed.	29 8	Pl.	29 6 $\frac{2}{3}$
		G. H.	30 3		30 2
		L. H.	28 0		28 7
Ther.	{	Med.	9 8		12 7
		G. H.	12 6		14 3
		L. H.	7 4		10 3
Air	{	Ed. moist, V. W. and S. W. and som. E.			
		Pl. dry, V. to 5. W. to 12. E. to 23. N.			
		W. or S. W. to the end N. E.			
Rain, Ed. 1.422. Pl. 2.356 .					

## December.

Bar.	{	Med. Ed.	29 5	Pl.	29 8
		G. H.	30 2		30 2
		L. H.	28 9'		29 4

Ther.

Ther.	{ Med.	9 0	11 8	
	{ G. H.	11 7	14 8	
	{ L. H.	5 7	10 2	
Air	{ Ed. moist,	V. W. and S. W. sometimes E.		
	{ Pl. dry,	V. N. W. or N. E. somet. S. W.		
Rain,	Ed.	3.125.	Pl.	1.452.

January 1732.

Bar.	{ Med. Ed.	29 3	Pl. 29 6	Nor.	28 68
	{ G. H.	30 2	30		29 01
	{ L. H.	28 9	28 9		28 33
Ther.	{ Med.	8 8	11 5		
	{ G. H.	11 5	12 7		
	{ L. H.	6 8	9 5		
Air	{ Ed. moist	V. to 7. E. and S. E. and N. E.			
		to 11 W. S. W. to 20 E. to end W.			
	{ Pl. dry,	V. in begin. N. E. afterw. S.			
	{ Nor. V. to 11	N. E. to 15 N. to end			
		N. E. and N. N. E.			
Rain,	Ed.	1.283.	Pl.	3.564.	

February.

Bar.	{ Med. Ed.	29 4	Pl. 29 7	Nor.	28 7
	{ G. H.	30 2	30 1		29 2
	{ L. H.	28 7	29 1		28 34
Ther.	{ Med.	10 4	12 8		
	{ G. H.	12 8	13 7		
	{ L. H.	8 6	11 8		
Air	{ Ed. to 20.	moist, then drier. V. S. W.			
	{ Pl. V. W.				
	{ Nor. V. variable.				
Rain,	Ed.	2.409.	Pl.	3.564.	

March.

Bar.	{ Med. Ed.	29 6	Pl. 29 6 $\frac{3}{10}$	Nor.	28 72
	{ G. H.	30 1	30 2		29
	{ L. H.	29 2	28 8		28 1
	D	2			Ther.

Ther.	Med.	10 4	12 8
	G. H.	13 6	13 8
	L. H.	7 6	10 4
Ed. mean V. variable.			
Pl. dry, V. variable N.			
Air	Nor. V. to 15.	W. N. W.	N. W.
	to end	N. E. N. E.	
Rain, Ed. o. 793. Pl. 3.174.			

## April.

Bar.	Med. Ed.	29 5	Pl. 29 4 $\frac{10}{12}$	Nor. 28 61
	G. H.	30 0	29 7	28 9
	L. H.	29 1	29 2	28 32
Ther.	Med.	10 8	13 7	
	G. H.	13 2	14 5	
	L. H.	9 0	12 3	
Air	Ed. to 13. moist, V. E. to 18. dry, V.			
	N. W. to end moist, E. N. E. or S. E.			
	Pl. in begin. and end dry, from 18. to 24. moist V. S.			
	Nor. to 12.	V. N. E.	N. N. E. to end V.	
		W. and N. N. W.		
Rain, Ed. 3.106. Pl. 2.196.				

## May.

				May.				
		{ Med. Ed.	29 5	Pl.	29 4 $\frac{10}{11}$	Nor.	28 7	
Bar.	{	G. H.	29 9		29 7		28 97	
	{	L. H.	29 0		28 8		28 23	
	{	Med.	12 2		14 2			
Ther.	{	G. H.	14 6		14 8			
	{	L. H.	9 1		12 7			
	{	Ed. dry, V. variable.						
Air	{	Pl. from 6. to 22. dry.						
	{	Nor. V. variable.						
Rain,	Ed.	4.627.	Pl.	2.424				

Bar.

## June.

Bar.	Med. Ed.	29 8	Pl.	29 6 $\frac{1}{2}$	Nor.	28 8
	G. H.	30 3		30 0		28 95
	L. H.	29 4		29 0		28 55

Ther.	Med.	14 1		15 6		
	G. H.	15 9		16 5		
	L. H.	12 0		14 2		

Ed. very dry, V. variable.  
 Pl. to the 18. v. dry, from the 5. to 12.  
 V. E. from 19. to 22. V. W. aft. N.  
 Nor. V. W. S. W. N. W.

Rain, Ed. 1.196. Pl. 1.270.

## July.

Bar.	Med. Ed.	29 7	Pl.	29 5 $\frac{1}{2}$	Nor.	28 82
	G. H.	30 1		29 8		29 0
	L. H.	29 2		29 0		28 55

Ther.	Med.	13 9		15 8		
	G. H.	16 1		16 7		
	L. H.	11 7		14 5		

Ed. dry V. W. S. W. N. W.  
 Pl in begin. and end v. dry, V. N. from  
 8. to 14. V. S.  
 Nor. to 17. v. variable, to end V. W.  
 S. W. N. W.

Rain, Ed. 3.199. Pl. 2.288.

## August.

Bar.	Med. Ed.	29 9	Pl.	29 5 $\frac{10}{10}$	Nor.	28 85
	G. H.	31 1		29 9		29 13
	L. H.	29 3		29 2		28 73

Ther.	Med.	13 3		16 1		
	G. H.	15 6		16 8		
	L. H.	11 5		14 5		

D 3

Air.

*Ed.* gen. dry. *V.* variable.  
*Pl.* in begin. and end, v. dry, *V. E.* from  
*Air* { 9. to 26. *V.* variable.  
*Nor.* to 8. *V. N. W.* to 16. *V. S. E.* to  
 22. *V. N. E.* to end variable.  
*Rain, Ed.* 1.625. *Pl.* 0.362.

## September.

*Bar.* { *Med. Ed.* 29 6 *Pl.* 29 6 *Nor.* 28 84  
 { *G. H.* 30 3 30 1 29 26  
 { *L. H.* 28 3 29 0 28 24  
*Ther.* { *Med.* 12 2 15 0  
 { *G. H.* 14 6 15 9  
 { *L. H.* 9 8 13 6  
*Air* { *Ed.* dry, *V. W. S. W. N. W.*  
 { *Pl.* to 10. *V. N. E.* to 20. *V. S. W. N.*  
 { *W.*  
 { *Nor.* to 9. *V. E. N. E.* to end *V. W. S. W.*

*Rain, Ed.* No register of rain was kept this month at Edinburgh.

## October.

*Bar.* { *Med. Ed.* 29 3 *Pl.* 29 2 $\frac{25}{9}$  *Nor.* 28 38  
 { *G. H.* 30 1 29 8 29 2  
 { *L. H.* 28 9 28 7 28 54  
*Ther.* { *Med.* 11 1 14 5  
 { *G. H.* 12 7 15 1  
 { *L. H.* 9 5 12 4  
*Air* { *Ed.* moist, *V. S. W.*, *W.* and fomet. *S. E.*  
 { *Pl.* *V.* in gen. *S.* end dry, *V. N. E.*  
 { *Nor.* *V. E. S. E. N. E.*  
*Rain, Ed.* 2.523. *Pl.* 6.342.

## November.

*Bar.* { *Med. Ed.* 29 8 *Pl.* 29 9 *Nor.* 28 7  
 { *G. H.* 30 4 30 4 29 10  
 { *L. H.* 29 4 29 4 28 27  
*Ther.*

Ther.	Med.	9 3	12 0
	G. H.	10 6	13 0
	L. H.	7 2	10 7

*Ed.* to 17. moist, V. S. S. E, W. to 21. dry, V. N. W. to end moist, V. W.

*Pl.* very dry V. E. N.

*Nor.* to 15. V. E. N. E. to end V. S. W. W. S. W.

Rain, *Ed.* 0.415. *Pl.* 0.584.

At Rippon, in the latter end of November, there was a little snow, with frost, for two weeks; after which it was uncommonly warm, dry, and pleasant, till the latter end of December, when there was a little frost and snow again.

*December.*

Bar.	Med. <i>Ed.</i>	29 8	<i>Pl.</i> 29 $5\frac{2}{8}$	<i>Nor.</i> 28 74
	G. H.	30 4	30 2	29 13
	L. H.	28 2	28 8	28 33

Ther.	Med.	9 1	12 7
	G. H.	11 8	13 7
	L. H.	6 6	10 4

*Ed.* to 18. moist, V. variable to 26. very moist, V. S. E. to end moist, V. S. W. W.

*Pl.* in begin. very dry, V. N. E, E. from 16. to end moist, V. S. W, S.

*Nor.* V. E. N. E.

Rain, *Ed.* 3.617. *Pl.* 4.918.

*January 1733.*

Bar.	Med. <i>Ed.</i>	29 8	<i>Pl.</i> 29 $7\frac{2}{3}$	<i>Nor.</i> 28 97
	G. H.	30 2	30 2	29 42
	L. H.	29 0	29 3	28 25

Ther.	Med.	9 6	12 6
	G. H.	12 1	13 2
	L. H.	7 0	10 8

*Air.*

*Ed.* moist V. S. W.  
*Air* { *Pl.* in begin. moist, from 16 to 25 dry,  
           V. E.  
       *Nor.* V. E. N. E. S. E.  
*Rain, Ed.* 1.370. *Pl.* 2.384.

At Rippon there was very little rain, and the weather was uncommonly warm and pleasant.

## February.

*Bar.* { *Med. Ed.* 29 6 *Pl.* 29 16 $\frac{2}{10}$  *Nor.* 28 87  
           G. H. 29 8 30 0 29 25  
           L. H. 28 8 29 2 28 42  
*Ther.* { *Med.* 9 9 12 3  
           G. H. 11 7 12 9  
           L. H. 8 5 11 2  
*Air* { *Ed.* moist, V. S. W.  
           *Pl.* moist, V. W.  
           *Nor.* V. W. S. W, N. W. from 20 to  
               25. V. N. E.  
*Rain, Ed.* 2.525. *Pl.* 3.734.

## March.

*Bar.* { *Med. Ed.* 29 6 *Pl.* 29 4 $\frac{2}{8}$  *Nor.* 28 55  
           G. H. 30 2 30 2 29 05  
           L. H. 29 1 28 9 7 99  
*Ther.* { *Med.* 9 9 12 4  
           G. H. 12 5 13 7  
           L. H. 7 4 10 8  
*Air* { *Ed.* very moist, V. E. S. E.  
           *Pl.* from 8. to 22. dry. V. N. after-  
               moist, V. S. E.  
           *Nor.* V. W. S. W, N. W. somet. E. N. E  
*Rain. 2.* 638. *Pl.* 3. 098.

April.

## April.

	{ Med. Ed. 29 7	Pl. 29 6	Nor. 28 54
Bar.	{ G. H. 30 2	30 0	29 04
	{ L. H. 29 2	29 1	28 47
	{ Med. 11 6	13 8	
	{ G. H. 13 4	14 5	
	{ L. H. 10 3	12 7	
	{ Ed. moist, V. E. N. E. S. E.		
Air	{ Pl. dry, V. E.		
	{ Nor. to 21. V. variable to end N. W.		
Rain,	Ed. 0. 818. Pl. 2. 284.		

## May.

	{ Med. Ed. 29 8	Pl. 29 5 $\frac{10}{12}$	Nor. 28 70
Bar.	{ G. H. 30 2	29 8	29 07
	{ L. H. 29 9	29 2	28 43
	{ Med. 12 7	14 4	
Ther.	{ G. H. 15 9	16 1	
	{ L. H. 10 7	13 5	
	{ Ed. dry V. E. N. E, S. E.		
Air	{ Pl. very dry V. E.		
	{ Nor. V. N. W.		
Rain,	Ed. 0. 083. Pl. 1. 010.		

## June.

	{ Med. Ed. 29 8	Pl. 29 4 $\frac{28}{12}$	Nor. 28 96
Bar.	{ G. H. 30 0	29 8	29 09
	{ L. H. 28 9	28 8	28 55
	{ Med. 14 2	16 1	
Ther.	{ G. H. 16 1	16 7	
	{ L. H. 12 6	14 9	
	{ Ed. very dry to 13. V. E. to end S. W, W.		
Air	{ Pl. in begin. and end dry. V. frequently		
	{ E. often W.		
	{ Nor. V. N. W.		
Rain, Ed. 2. 138. Pl. 1. 534.			

July.

## July.

Bar.	{	Med. Ed.	29 7	Pl.	29 4 $\frac{6}{28}$	Nor.	28 8
		G. H.	30 1		29 7		28 9
		L. H.	29 4		29 0		28 9
Ther.	{	Med.	14 6		16 7		
		G. H.	15 8		18 0		
		L. H.	12 2		15 1		
Air	{	Ed. dry, V. W.					
		Pl. very dry, V. N. E., N. W. sometimes S.					
		Nor. V. N. W. S. W. W.					
Rain,		Ed. 0.638. Pl. 0.772.					

## August.

Bar.	{	Med. Ed.	29 6	Pl.	20 4 $\frac{23}{30}$	Nor.	28 7
		G. H.	29 8		29 9		28 9
		L. H.	29 1		29 0		28 4
Ther.	{	Med.	13 2		15 7		
		G. H.	15 0		16 7		
		L. H.	12 1		13 8		
Air	{	Ed. dry, V. variable, but generally W.					
		S. W. N. W.					
		Pl. mean V. W.					
		Nor. V. W. S. W, N. W.					
Rain, Ed. 2.675. Pl. 4.500.							

## September.

Bar.	{	Med. Ed.	29 6	Pl.	29 6 $\frac{9}{29}$	Nor.	28 8
		G. H.	30 2		30 1		29 1
		L. H.	28 4		29 0		28 7
Ther.	{	Med.	12 2		14 7		
		G. H.	13 8		15 2		
		L. H.	10 5		12 9		

Air.

*Air* { *Ed.* to 14. dry, to 20 very moist, to the end dry, *V.* variable.  
*Pl.* dry *V.* variable, but from 9. to 18. E.  
*Nor.* *V.* W. N. W. from 13. to 16. E.  
*Rain*, *Ed.* 1.835. *Pl.* 1.978.

At Rippon, during the months of March, April, May, June, July, August, and till after the middle of September, the weather was very dry, and the mercury at a great height; afterwards the weather was cold, and very rainy, and the mercury sunk.

October.

*Bar.* { *Med. Ed.* 29 8 *Pl.* 29 7 $\frac{1}{3}$  *Nor.* 28 86  
*G. H.* 30 4 30 2 29 27  
*L. H.* 28 9 28 8 28 32  
*Ther.* { *Med.* 10 9 13 1  
*G. H.* 13 7 14 7  
*L. H.* 8 9 13 8  
*Air* { *Ed.* mean *V.* W. S. W., N. W.  
*Pl.* dry, *V.* E. N. E.  
*Nor.* *V.* N. N. W.

*Rain*, *Ed.* 1.083. *Pl.* 2.026.

November.

*Bar.* { *Med. Ed.* 29 7 *Pl.* 29 7 $\frac{26}{33}$  *Nor.* 28 02  
*G. H.* 30 3 30 2 29 23  
*L. H.* 29 1 29 1 28 09  
*Ther.* { *Med.* 10 8 13 1  
*G. H.* 12 7 13 7  
*L. H.* 8 2 11 6  
*Air* { *Ed.* moist *V.* W. S. W.  
*Pl.* end moist, *V.* W.  
*Nor.* *V.* W. N. W. S. W. sometimes E.  
N. E.

*Rain*, *Ed.* 0.326. *Pl.* 4.088.

At

At Rippon the weather continued to be much the same as before, till the latter end of November when the mercury rose, the spirits in the thermometer fell, and then was a sharp frost for several nights.

*December.*

	Med. Ed.	29 5	Pl. 29 5 <sup>26</sup> <sub>31</sub>	Nor. 28 90
Bar.	G. H.	30 2	30 1	29 16
	L. H.	28 8	29 1	28 67
	Med.	10 7	12 9	
Ther.	G. H.	12 6	13 8	
	L. H.	8 9	10 8	
	Ed. very moist,	V. W. S. W.		
Air	Pl. V. S. W.			
	Nor. V. gen. S. W. but freq. E. and N. E.			
Rain, Ed. 3.629. Pl. 4.688.				

At Rippon it was uncommonly warm, even more so than the winter before, and continued till the latter end of the month, when the mercury sunk low, and there was a good deal of rain.

*January 1734.*

	Med. Ed.	29 9	Pl. 29 9 <sup>16</sup> <sub>19</sub>	Nor. 28 91
Bar.	G. H.	30 6	30 4	29 19
	L. H.	29 2	29 4	28 18
Ther.	Med.	8 8	11 2	
	G. H.	11 5	12 1	
	L. H.	6 2	9 4	
Air.	Ed. moist	V. W. S. W.		
	Pl. dry	V. N. E.		
	Nor. V. generally	W. S. W, N. W. but frequently E. N. E.		
Rain.	Ed.	0.593.	Pl.	1.480.

At Rippon there was a little rain the 17th, then three days of serene weather, then three days

days of rain; afterwards the mercury rose high, the weather became warm and pleasant, and continued so all the remaining part of the winter and spring, till May.

February.

	Med. Ed.	29 6	Pl. 29	$6\frac{10}{8}$	Nor. 28	78
Bar.	G. H.	30 3	30	4	29	28
	L. H.	28 6	28	5	28	15
	Med.	10 5	12	3		
Ther.	G. H.	12 2	12	7		
	L. H.	10 6	10	8		
Air	Ed. moist V. W. S. W.					
	Pl. V. W. N. W.					
	Nor. V. W. S. W. N. W.					

Rain, Ed. 0.595. Pl. 5.554.

March.

	Med. Ed.	29 5	Pl. 29	5	Nor. 28	78
Bar.	G. H.	29 9	30	0	28	98
	L. H.	29 1	29	0	28	45
	Med.	11 1	13	1		
Ther.	G. H.	12 5	13	6		
	L. H.	9 5	11	8		
Air	Ed. dry, V. variable.					
	Pl. moist, V. W.					
	Nor. V. generally W. S. W. N. W.					

Rain, Ed. 2.122. Pl. 2.812.

April.

	Med. Ed.	29 8	Pl. 29	$6\frac{2}{8}$	Nor. 28	82
Bar.	G. H.	30 2	30	0	29	12
	L. H.	29 4	29	4	28	57
	Med.	12 2	13	8		
Ther.	G. H.	14 7	14	7		
	L. H.	9 4	12	7		

Vol. V.

E

Air

*Ed.* dry, V. variable.  
*Air* { *Pl.* middle dry, V. E. to 12 .N.W. from  
 23. to end S. W.  
*Nor.* V. generally W.S. W, N. W.  
*Rain,* *Ed.* 1.006. *Pl.* 2.126.

## May.

*Bar.* { *Med.* *Ed.* 29 8 *Pl.* 29 4 $\frac{10}{31}$  *Nor.* 28 72  
 { G. H. 30 1 29 9 29 01  
 { L. H. 29 3 29 0 28 51  
*Ther.* { *Med.* 12 1 13 9  
 { G. H. 13 9 14 7  
 { L. H. 9 8 12 5  
*Air* { *Ed.* dry, to 26. V. variable, from 26. to  
 end, moist. V. E.  
 { *Pl.* V. gen. W. sometimes S. E.  
 { *Nor.* V. W. S. W, N. W.  
*Rain,* *Ed.* 3.313. *Pl.* 1.764.

## June.

*Bar.* { *Med.* *Ed.* 29 8 *Pl.* 29 4 $\frac{11}{29}$  *Nor.* 28 88  
 { G. H. 30 0 29 7 29 02  
 { L. H. 29 5 29 1 28 33  
*Ther.* { *Med.* 13 8 15 6  
 { G. H. 17 4 16 5  
 { L. H. 10 1 14 2  
*Air* { *Ed.* mean. V. E. N. E, S. E.  
 { *Pl.* in begin. and end V. N. W. in the  
 middle E.  
 { *Nor.* V. N. W, W. sometimes N. N. E.  
*Rain,* *Ed.* 2.210. *Pl.* 3.208.

During the months of May and June, at Rippon the weather was mostly much colder than in the two preceeding months, and much more variable.

# AND OBSERVATIONS. 51

July.

Bar.	{ Med. Ed.	29 7	Pl.	29 4 $\frac{10}{37}$	Nor.	28 77
	{ G.H.	30 1		29 8		28 94
	{ L. H.	29 3		28 9		28 53
Ther.	{ Med.	14 11		15 5		
	{ G. H.	16 5		16 7		
	{ L. H.	12.6		14 5		
Air	{ Ed. in begin. dry, V. variable, from 26. to end, very moist, V. E.					
	{ Pl. very moist, V. generally N. in the middle S. W.					
	{ Nor. V. W. S. W, N. W.					
Rain, Ed. 0.709. Pl. 2.982.						

At Rippon the weather was very changeable.

August.

Bar.	{	Med. Ed.	29 6	Pl.	29 3 $\frac{27}{37}$	Nor.	28 88
		G.H.	30 1		29 8		28 94
		L. H.	28 7		28 7		28 58
Ther.	{	Med.	13 3		15 5		
		G.H.	15 6		16 7		
		L. H.	12 5		13 7		
Air	{	Ed. dry, V. variable.					
		Pl. in begin. dry V. N. E. after. moist, V.S. W.					
		Nor. V. W. S.W, N.W. sometimes N.E.					
Rain, Ed. 1.285. Pl. 1.022.							

At Rippon in the beginning of this month the mercury was high, and also the spirits in the thermometer, and the season was dry, warm, and pleasant, which continued till the middle; when the barometer fell again, and there was almost daily frequent rain, which continued the remaining part of this, and during the months of September and October.

## September.

	{	Med.	Ed. 29 6	Pl. 29 6 $\frac{3}{7}$	Nor. 28 76
Bar.	{	G. H.	30 0	30 0	29 15
	{	L. H.	28 7	29 0	28 57
	{	Med.	12 0	14 3	
Ther.	{	G. H.	14 4	14 9	
	{	L. H.	9 9	12 2	
	{	Ed. generally dry, V. variable.			
Air	{	Pl. moist, V. W.			
	{	Nor. V. W. S. W, N. W.			
Rain,	Ed.	1.172.	Pl.	1.752.	

## October.

	{	Med. Ed.	29 5	Pl.	29 5 $\frac{2}{3}$	Nor.	28 58
Bar.	{	G. H.	30 2		30 3		28 93
	{	L. H.	28 8		28 8		28 12
	{	Med.	10 3		12 6		
Ther.	{	G. H.	12 4		13 8		
	{	L. H.	9 0		10 6		
	{	Ed. moist V. variable, but gen. W. S. W.					
		N. W.					
Air	{	Pl. moist in begin. V. S. W. from 15. to 23					
		N. E. after. N. W.					
	{	Nor. V. in gen. W. S. W, N. W. and fre-					
		quently N. E. and E.					
Rain,		Ed. 1.321. Pl. 3.154.					

## November.

	{	Med. Ed.	29 9	Pl.	29 8 $\frac{4}{5}$	Nor.	28 87
Bar.	{	G. H.	30 4		30 4		29 25
	{	L. H.	29 3		28 8		28 10
	{	Med.	9 3		11 5		
Ther.	{	G. H.	11 7		12 4		
	{	L. H.	7 7		9 9		
	{	Ed. moist V. W. S. W.					
Air	{	Pl. dry to the 20. V. betwixt E. and N.					
	{	Nor. V. variable.					
Rain,		Ed. 1.608. Pl. 2.068.					

## December.

December.

	{	Med. Ed.	29 0	Pl.	29 3 $\frac{9}{11}$	Nor.	28 49
Bar.	{	G. H.	29 8		30 0		28 98
	{	L. H.	28 10		28 2		27 80
	{	Med.	9 1		11 4		
Ther.	{	G. H.	11 5		12 5		
	{	L. H.	7 4		10 6		
	{	Ed. moist, V. W. S. W, N. W.					
Air	{	Pl. moist, V. S. W.					
	{	Nor. V. E. S. E, N. E.					
Rain,		Ed. 2.322. Pl. 6.192.					

January 1735.

	{	Med.	Ed. 29 5	Pl. 29 6 $\frac{24}{30}$	Nor. 28 51
Bar.	{	G. H.	30 3	30 5	29 17
	{	L. H.	28 2	28 1	28 05
	{	Med.	9 2	11 2	
Ther.	{	G. H.	11 6	12 2	
	{	L. H.	7 6	9 6	
	{	Ed. very moist, V. W. S. W.			
	{	Pl. oft. very moist, V. in begin. N. mid.			
Air	{	dle S. W. end N. E.			
	{	Nor. V. W. S. W, N. W. sometimes E			
	{	S. E, N. E.			
Rain, Ed. 2.995. Pl. 2.526.					

February.

	{	Med. Ed.	29 0	Pl.	29 7 $\frac{10}{15}$	Nor.	28 81
Bar.	{	G. H.	30 5		30 5		29 18
	{	L. H.	28 8		29 0		28 33
	{	Med.	9 0		11 4		
Ther.	{	G. H.	12 4		12 1		
	{	L. H.	7 4		9 5		
		E 3					
		Air					

*Air* { *Ed.* moist, V. W. S. W.  
*Pl.* moist, sometimes dry, V. to the 16.  
 N. end S.  
*Nor.* V. W. S. W, N. W.  
*Rain, Ed.* 3.507. *Pl.* 1.978.

## March.

*Bar.* { *Med. Ed.* 29 3 *Pl.* 29  $3\frac{2}{3}$  *Nor.* 28 49  
 { *G. H.* 30 2 30 0 29 02  
 { *L. H.* 29 0 28 7 28 11  
*Ther.* { *Med.* 9 9 11 7  
 { *G. H.* 11 9 12 4  
 { *L. H.* 8 5 10 4

*Air* { *Ed.* vastly moist, V. variable.  
 { *Pl.* moist in begin. V. S. W. from 6. to  
 17. S. E. after. N. E, N. W.  
*Nor.* V. W. S. W, N. W. frequent. N. E.  
*Rain, Ed.* 5.375. *Pl.* 2.234.

## April.

*Bar.* { *Med. Ed.* 29 7 *Pl.* 29  $5\frac{1}{2}$  *Nor.* 28 71  
 { *G. H.* 30 1 29 9 29 03  
 { *L. H.* 29 0 28 8 28 30  
*Ther.* { *Med.* 11 2 13 5  
 { *G. H.* 13 5 13 7  
 { *L. H.* 19 7 12 1

*Air* { *Ed.* vastly moist, to 12. V. E. to end W.  
 S. W, N. W.  
 { *Pl.* moist, from 2. to 10. V. E. after. va-  
 riable.  
*Nor.* V. W. S. W, N. W.  
*Rain, Ed.* 1.630. *Pl.* 2.252.

## May.

*Bar.* { *Med. Ed.* 29 8 *Pl.* 29  $6\frac{1}{3}$  *Nor.* 28 61  
 { *G. H.* 30 2 30 1 28 9  
 { *L. H.* 29 2 29 1 28 3  
*Ther.*

Ther.	{	Med.	12 1	13 8
		G. H.	14 7	14 9
		L. H.	9 5	12 1
Air	{	Ed. mean, V. inconstant.		
		Pl. to 24. V. N. E, N. W. after S. E.		
		Nor. V. W. S. W, N. W.		
Rain, Ed. 0.720. Pl. 1.646.				

## June.

<i>Bar.</i>	Med. <i>Ed.</i>	29 7	<i>Pl.</i> 29 5 $\frac{7}{9}$	<i>Nor.</i> 28 75
	G. H.	30 1	29 9	28 98
	L. H.	29 4	29 1	28 52
<i>Ther.</i>	Med.	13 5	14 9	
	G. H.	15 5	15 1	
	L. H.	11 8	13 7	
<i>Air</i>	<i>Ed.</i> dry in beginning and middle moist, V. E. N. E.			
	<i>Pl.</i> moist, V. N. W. sometimes S. W. from 19. to 22. S. E.			
	<i>Nor.</i> V. W. S. W, N. W.			

No register of rain after May 1735, is published at Edinburgh.

## July.

<i>Bar.</i>	Med. <i>Ed.</i>	29 7	<i>Pl.</i> 29 4 $\frac{4}{50}$	<i>Nor.</i> 28 76
	G. H.	30 0	29 7	29 05
	L. H.	29 1	28 9	28 47
<i>Ther.</i>	Med.	14 2	15 1	
	G. H.	16 0	15 9	
	L. H.	12 1	13 7	
<i>Air</i>	<i>Ed.</i> dry, frequent. moist, V. inconstant.			
	<i>Pl.</i> very moist, V. W. S. and somet. E.			
	<i>Nor.</i> V. S. W, W.			

## August.

<i>Bar.</i>	Med. <i>Ed.</i>	29 8	<i>Pl.</i> 29 6	<i>Nor.</i> 28 94
	G. H.	30 3	29 9	29 17
	L. H.	29 2	29 2	28 66
<i>Ther;</i>				

<i>Ther.</i>	{	Med.	13 8	15 5	
		G. H.	17 0	16 5	
		L. H.	11 5	13 9	
<i>Air</i>	{	<i>Ed.</i> dry, V. E. to 11. after S. W, W.			
		<i>Pl.</i> very moist, from 2. to 13. V. E.			
		<i>Nor.</i> V. W. S. W, N. W.			

## September.

<i>Bar.</i>	{	Med. <i>Ed.</i>	29 6	<i>Pl.</i> 29 6 $\frac{7}{10}$	<i>Nor.</i> 28 91
		G. H.	30 0	29 9	29 13
		L. H.	28 7	29 2	28 58
<i>Ther.</i>	{	Med.	12 0	14 9	
		G. H.	14 4	15 7	
		L. H.	9 9	13 1	
<i>Air</i>	{	<i>Ed.</i> dry, V. W. S. W.			
		<i>Pl.</i> moist, V. N. W. sometimes S. W. frequently E.			
		<i>Nor.</i> V. S. W, N. W. freq. E. N. E, S. E.			

## October.

<i>Bar.</i>	{	Med. <i>Ed.</i>	29 9	<i>Pl.</i> 29 6 $\frac{17}{36}$	<i>Nor.</i> 28 82
		G. H.	30 3	30 1	29 17
		L. H.	29 3	29 1	28 24
<i>Ther.</i>	{	Med.	10 1	13 2	
		G. H.	12 7	14 2	
		L. H.	8 1	10 6	
<i>Air</i>	{	<i>Ed.</i> moist from 11. to 22. V. E. and S. E. afterwards W.			
		<i>Pl.</i> V. E.			
		<i>Nor.</i> V. variable.			

## November.

<i>Bar.</i>	{	Med. <i>Ed.</i>	29 5	<i>Pl.</i> 29 4 $\frac{14}{36}$	<i>Nor.</i> 28 81
		G. H.	30 0	30 0	29 28
		L. H.	28 8	28 4	28 20
<i>Ther.</i>	{	Med.	10 5	12 8	
		G. H.	12 1	13 7	
		L. H.	7 7	11 5	

*Air*

*Ed.* moist, *V.* inconstant.  
*Air* { *Pl.* moist, *V.* S.  
       *Nor.* *V.* variable.

## December.

*Bar.* { *Med. Ed.* 29 7 *Pl.* 29  $6\frac{6}{17}$  *Nor.* 28 67  
       *G. H.* 30 2 30 0 29 16  
       *L. H.* 29 0 29 0 28 31  
*Ther.* { *Med.* 9 6 12 1  
       *G. H.* 11 5 13 3  
       *L. H.* 7 5 10 4  
*Air* { *Ed.* very moist, *V.* variable.  
       *Pl.* vastly moist, *V.* E. and S. E.  
       *Nor.* to 22. variable, to end E.

## January 1736.

*Bar.* { *Med. Ed.* 29 3 *Pl.* 29  $2\frac{27}{30}$  *Nor.* 28 58  
       *G. H.* 29 7 29 8 29 01  
       *L. H.* 28 9 28 7 28 09  
*Ther.* { *Med.* 9 2 11 8  
       *G. H.* 11 7 12 7  
       *L. H.* 7 3 10 4  
*Air* { *Ed.* moist, *V.* S. W, W.  
       *Pl.* very moist, *V.* S.  
       *Nor.* V. E. S. E, N. E. sometimes S. S.  
       W, N. W.

## February.

*Bar.* { *Med. Ed.* 29 4 *Pl.* 29  $3\frac{10}{18}$  *Nor.* 28 28  
       *G. H.* 30 1 30 0 28 77  
       *L. H.* 29 0 28 5 27 95  
*Ther.* { *Med.* 8 5 11 2  
       *G. H.* 10 3 11 8  
       *L. H.* 6 3 9 3  
*Air* { *Ed.* moist, *V.* variable.  
       *Pl.* V. N. E. not so moist as last month.  
       *Nor.* *V.* variable.

March.

## March.

Bar.	{	Med. Ed.	29 6	Pl.	29 4 $\frac{1}{4}$	Nor.	28 59
		G. H.	30 2		30 0		29 01
		L. H.	28 9		28 8		28 24
Ther.	{	Med.	10 5		12 6		
		G. H.	14 7		13 6		
		L. H.	8 8		10 4		
Air	{	Ed. moist, V. E. S. E, N. E.					
		Pl. dry, V. E.					
		Nor. V. variable.					

## April.

Bar.	{	Med. Ed.	29 8	Pl.	29 7 $\frac{1}{2}$	Nor.	28 84
		G. H.	30 3		30 1		29 13
		L. H.	28 9		29 3		28 59
Ther.	{	Med.	11 5		13 8		
		G. H.	14 5		15 5		
		L. H.	8 5		11 5		
Air	{	Ed. moist, V. variable.					
		Pl. V. E. N. W. sometimes N. E.					
		Nor. V. W. S. W, N. W.					

## May.

Bar.	{	Med. Ed.	29 8	Pl.	29 5	Nor.	28 65
		G. H.	30 3		29 8		29 01
		L. H.	29 3		29 1		28 30
Ther.	{	Med.	11 8		14 9		
		G. H.	14 9		16 4		
		L. H.	10 0		12 4		
Air	{	Ed. dry, V. E.					
		Pl. V. E. sometimes N. E, N. W.					
		Nor. V. N. W, S. W.					

*Of the epidemic Diseases at Edinburgh, Rippon, Plymouth, and Norimberg.*

I Shall divide the diseases, which were frequent, during these five years at those places, into four classes.

1. Diseases of nearly the same kind, which were in several of these places about the same time.

2. Diseases of nearly the same kind, which were at several places in different years, or different times of the same year.

3. Diseases of different kinds, that were at nearly the same time in several places.

4. Diseases which were in any one of the places mentioned, and not in any of the others.

*1. Diseases of nearly the same kind, which were in several Places about the same Time.*

Small-pox.	{	Edin. and Nor. from Spring 1733, to March 1734.
	{	Nor. and Plym. in March 1732,
	{	Ed. Pl. Rip. July 1731.
	{	Ed. Pl. Nor. May, June 1733,
	{	April 1734.
Intermit- ting Fevers.	{	Ed. Pl. May, June 1734, June 1735.
	{	Ed. Nor. April, May, July 1732,
	{	March 1734.
	{	Pl. Nor. July 1733.
	{	Nor. Rip. September 1733.

Slow

Slow Fev. *Ed. Pl.* August 1732.

Pleurisies. { *Ed. Pl.* March, April 1732.  
March 1733, February 1736.  
*Ed. Nor.* Feb. 1733, July 1735.  
*Pl. Nor.* April 1733, Feb. 1739.

A Cholera, *Ed. Rip.* August 1731.

Angina. { *Ed. Pl. Nor.* January 1732.  
*Ed. Nor.* October 1733.  
*Pl. Nor.* February 1732.

Scarlet Fevers. { *Ed. Nor.* September, Oct. 1733.

A Rheumatism. { *Ed. Pl. Nor.* March 1732.  
*Ed. Nor.* Nov. 1732, Feb. 1733.  
*Pl. Nor.* Apr. 1732, March 1734.  
*Rip. Nor.* Sept. 1733, Jan. 1734.

Measles. { *Pl. Nor.* August, Sept. October  
1732, February 1733.

Kink-cough, *Ed. Pl.* May 1732, May, July 1734.

Cold and its Effects. { *Ed. Pl.* April, December 1733.  
Jan. 1733, *Pl. Nor.* Feb. 1734.

Catarrhs and { *Pl. Rip. Nor.* Feb. 1733.  
*Ed. Nor.* July 1735.

Catarrhal Fevers. { *Pl. Nor.* March, April 1733, Oct.  
1734.

Colic. *Pl. Nor.* November 1733.  
February 1732.

II. Diseases of nearly the same kind, which were  
at several Places in different Years, or diffe-  
rent Times of the same Year.

Small-pox.

*Pl.* from June to Sept. 1731, Au-  
gust 1732, from Aug. to Dec.  
1734, and from Jan. to Sept. 1735.  
*Rip.* from Autumn 1732, to Jan.  
1733.

*Nor.* January, May, June 1732.

*Ed.* June 1732, March, Apr. 1733.  
from Feb. to May 1735, and  
that summer.

Intermitting  
Fever.

*Pl.* August 1732, July, Sept.  
1734, October 1735.

*Rip.* June, Aug. 1731, and latter  
end of summer 1732.

*Nor.* October 1732.

*Ed.* From Nov. 1731, to Feb.  
1732, and Dec. 1732, January,  
March 1733.

Slow Fevers.

*Pl.* March 1733, August, Sept.  
October 1734, and October,  
Nov. December 1735.

*Rip.* June, July, Aug. 1731, Ja-  
nuary, February 1733.

*Ed.* October 1731, that winter,  
May 1732, and June 1735.

Pleurisies.

*Pl.* Feb. March 1735, and April,  
May 1736.

*Rip.* September, Dec. 1733, and  
January, May, June 1734.

*Nor.* Oct. Nov. 1732, Feb. April  
1734, December 1735.

V. V.

F

Cholera.

Cholera.

*Ed.* November 1732, July 1735  
*Pl.* Sept. Oct. 1731, May 1732  
 from July to Oct. 1733, Sep-  
 tember 1734, Aug. Sep. 1735  
*Rip.* Latter end of Summer 1733  
 June, July 1734.

Angina.

*Ed.* Dec. 1731, Nov. 1732, July  
 August, September 1732.  
*Pl.* Dec. 1732, March 1733  
 from February to Oct. 1734  
 April 1735, Feb. April 1736  
*Nor.* November 1733.

Erysipela-  
tous Fever.

*Ed.* June, July, September, Octo-  
 ber, November, Dec. 1735  
 January, February 1736.  
*Pl.* January 1735.

Rheuma-  
tism.

*Ed.* February 1736.  
*Pl.* December 1734.  
*Nor.* January, Feb. May, June  
 September, Oct. 1732, Jan.  
 March, May, June, August  
 November, December 1733  
 Oct. 1734, November 1735

Measles.

*Ed.* from June 1735 to spring 1736  
*Pl.* Aug. Nov. 1732, Jan. 1733  
*Nor.* January, Feb. July 1732.

Kink-cough.

*Ed.* March, April 1732, June  
 Aug. September, Oct. 1734  
 and all winter.  
*Pl.* August 1731, February 1732  
*Nor.* From June to Sept. 1733

Catarrhs

Gutarrhs and  
Catarrhus  
Fever.

*Ed.* June 1735, and that Winter.  
*Nor.* Jan. Feb. March, April,  
June 1732, May, Sept. Oct.  
1733, Feb. March, April, Oct.  
December 1734, Jan. 1735.

Universal  
Fever of the  
Cold.

*Ed.* Began Dec. 17. 1732, from  
the 25th till the Middle of  
Jan. universal, end Feb. 1733.

*Pl.* Began 12. Feb. 1733, univer-  
sal by 15. end April.

*Rip.* Began Feb. 3. 1733, end.  
five or six Week thereafter.

*Nor.* Began Sept. 1732, univer-  
sal Dec. end. Feb. 1733.

Apoplexy.

*Pl.* October 1733, March, No-  
vember 1734, March, May  
1735, January 1736.

*Nor.* February 1732.

Peripneu-  
mony.

*Pl.* March, April 1732, March,  
April, October, Dec. 1733,  
Jan. Feb. March 1734, Feb.  
March 1735, Feb. March, A-  
pril, May 1736.

*Rip.* September 1733.

Diseases of  
the Breast.

*Rip.* Latter part of Summer, Aut.  
and forepart of Winter 1733.

*Nor.* Jan. Feb. March 1733.

Putrid-Fe-  
ver.

*Pl.* December 1734.

*Rip.* September 1734.

Erysipelas.

*Ed.* July, August 1731.

*Pl.* June 1731.

Fev. with a  
Diarrhoea.

*Ed.* Dec. 1731, Jan. April,

May 1732, July 1735.

*Rip.* December 1733.

- Swell. of salivary Glands. { *Ed.* June, July, Aug. 1731.  
*Pl.* Nov. December 1735,  
 January 1736.
- Continued Fever. { *Ed.* October 1734, from Oct.  
 1735, to Feb. 1736.  
*Nor.* May 1733.
- Exanthematous Fevers. { *Pl.* Aug. Sept. 1731, June 1732,  
 Sept. 1734, Jan. June 1735.  
*Rip.* July 1734.
- Diarrhoea. { *Ed.* Jan. 1732.  
*Pl.* May, Aug. 1732, from June  
 to Oct. 1733, Aug. 1735.  
*Rip.* August 1731.  
*Nor.* July 1733, Aug. 1733.
- Scarlet Fevers. { *Ed.* June, July 1733, and that  
 winter.  
*Nor.* Dec. 1735.
- Ophthalmy. { *Ed.* July, Aug. 1731.  
*Pl.* March, April, June 1734,  
 Jan. 1735, April 1736.
- Hyster. and Hypochon. Symptoms. { *Pl.* Dec. 1733.  
*Rip.* Feb. 1733.
- Colic. { *Pl.* October, Nov. Dec. 1731,  
 Jan. 1732, Oct. Nov. Dec. 1733,  
 Jan. Oct. Nov. 1734.  
*Nor.* March, June, Nov. 1732.  
*Ed.* Nov. 1732, spring 1733.
- Cold and its Effects. { *Pl.* January, Feb. March, Sep-  
 tember, October 1732, Sept.  
 December 1733, January, Fe-  
 bruary, March, April 1734, Jan.  
 September 1735, Jan. Feb.  
 1736.

*Diseases of different kinds, which were nearly at the same Time in several Places.*

1731.

June.

*Ed.* Swelling on the face and salivary glands.

*Pl.* Small-pox, erysipelas.

*Rip.* Intermitting fevers.

July.

*Ed.* Ophthalmy, rheumatism, erysipelatus swelling on the face and salivary glands.

*Pl.* Small-pox.

*Rip.* Intermitting fevers.

August.

*Ed.* Ophthalmy, rheumatism, bastard small-pox, erysipelatus swelling on the face and salivary glands.

*Pl.* Febres miliares rubrae, kink-cough, small-pox.

*Rip.* Diarrhoea, intermitting fevers.

October.

*Ed.* Pleurisy.

*Pl.* Cholera.

*Ed.* Pleurisy, fever, with diarrh.

1732.

January.

*Pl.* Effects of cold.

*Nor.* Small-pox, measles, haemoptoe, catarrhs, rheumatism.

*Ed.* Pleurisy.

February.

*Pl.* The effects of cold.

*Nor.* The same diseases as last month, apoplexy, colic, stone, and gout.

March.

*Ed.* Erysipelas oedematodes, fever amongst the children, kink-cough.

*Pl.* Effects of cold, peripneumony.

*Nor.* Colic, stone, and gout, catarrhous fevers.

- April.* { *Ed.* Fever with a diarrhoea, kin  
 cough, erysipelas oedematous  
*Pl.* Small-pox. peripneumony  
*Nor.* Catarrhs.
- May.* { *Ed.* Pleurisy. &c. as last month  
*Pl.* Cholera  
*Nor.* Rheumatism, small-pox
- June.* { *Ed.* Intermitting fevers  
*Pl.* Febres miliares compostae,  
 rubeolæ.  
*Nor.* Rheumatism, small-pox, co-  
 lic, catarrhs.
- September.* { *Ed.* Slow fever.  
*Nor.* Rheumatism.  
*Rip.* Small-pox.
- October.* { *Ed.* Slow fevers.  
*Nor.* Intermitting fevers, pleurisy.  
*Rip.* Small-pox.
- November.* { Aguish fits amongst children.  
*Nor.* Pleurisy, colic, stone, and  
 gout.  
*Rip.* Small-pox.
- December.* { *Ed.* Slow fevers.  
*Pl.* Effects of cold.  
*Rip.* Small-pox.
1733. { *Ed.* Slow fever, pleurisy.  
*Pl.* Measles.
- January.* { *Nor.* Diseases of the breast, rheu-  
 matism.
- { *Ed.* Tertian agues.  
*Pl.* Angina, peripneumony.
- March.* { *Nor.* Diseases of the breast, hæ-  
 moptoe.
- May.* { *Ed.* Bastard small-pox.  
*Nor.* Rheumatism.

- June.* { *Ed.* Scarlet fevers and sore throats.  
*Nor.* Kink-cough, gout.  
*Ed.* Scarlet fevers, with a diarrhoea in several, anginae.  
*Pl.* Cholera, diarrhoea.  
*Rip.* Cholera.  
*July.* { *Nor.* Small-pox, kink-cough, diarrhoea, intermitting fevers.  
*August.* { *Ed.* Scarlet fevers and sore throats.  
*Pl.* Cholera, diarrhoea.  
*Nor.* Rheumatism, kink-cough.  
*Pl.* Cholera, diarrhoea.  
*September.* { *Rip.* Pleurisy, peripneumony.  
*Nor.* Catarrhs, kink-cough, gout.  
*Pl.* Cholera, diarrhoea, apoplexy, peripneumony, rubeolæ, colic.  
*October.* { *Nor.* Catarrhs.  
*Ed.* Scarlet fevers and sore throats.  
*November.* { *Pl.* Rubeolæ, colic.  
*Nor.* Anginae, rheumatism.  
*Ed.* Scarlet fevers and sore throats.  
*Pl.* Colic, peripneumony, cough, hyst. and hypochon.  
*December.* { *Nor.* Hæmoptoe, gout.  
*Rip.* Pleurisy, sev. with a looseness.  
*Pl.* Coughs, peripneumony, colic.  
*January.* { *Rip.* Inflammation of the intestines, pleurifies.  
*Nor.* Stone, gout.  
*1734.* { *Pl.* Peripneumony, anginae.  
*February.* { *Nor.* Pleurisy, catarrhs.  
*Ed.* Intermitting fevers.  
*March.* { *Pl.* Coughs, sore throats, ophthalmia, rheumatism, peripneumony, apoplexy.  
*April.*

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- April.* { *Pl.* Ophthalmy, sore throats, apoplexy, anginous fever.  
*Nor.* Pleurisy, rheumatism.
- May.* { *Pl.* Anginous fever.  
*Rip.* pleurisy.
- June.* { *Ed.* Kink-cough, ophthalmy.  
*Pl.* Anginous fever.  
*Rip.* Pleurisy.
- July.* { *Pl.* Inter. fevers, anginous fever.  
*Rip.* Exanthemat. fever, cholera.  
*Ed.* Kink-cough.
- August.* { *Pl.* Anginous fever, ophthalmy, flow fevers, small-pox, itch.  
*Rip.* Putrid fever.  
*Ed.* Kink-cough, dysentery.
- September.* { *Pl.* Anginous fever, small-pox, cholera, flow fevers, inter. fev.  
*Ed.* Kink-cough, dysentery, fev.
- October.* { *Pl.* Small-pox, colic, sore throats, flow fever, anginous fever, febris miliaris.  
*Nor.* Rheumatism, gout.
- November.* { *Ed.* Kink-cough, dysentery.  
*Pl.* Small-pox, colic, apoplexy.  
*Ed.* Kink-cough, dysentery.
- December.* { *Pl.* Small-pox, putrid fevers, rheumatism.  
*Nor.* Catarrhs, febris petechizans.  
*Ed.* Kink-cough, dysentery.
- 1735.* { *Pl.* Small-pox, ophthal. coughs, rheumatism, febres miliares-cri-  
*January.* { sipelatosafes colic.  
*Nor.* Febris hemorrhialis petechizans, catarrhs, rheumatism, stone, and gout.

Febr. 1735

- Ed.* Tertian agues.  
*Pl.* Peripneumony, small-pox, contagious fever.  
*Nor.* Febris catarr. petechizans, catarrhus fever.
- Ed.* Tertian agues.  
*Pl.* Small-pox, pleurisy, peripneumony, apoplexy.  
*Ed.* Tertian agues, fevers amongst children.  
*Pl.* Small-pox, contagious fever.  
*Nor.* Febris catarr. petechizans.
- Ed.* Tertian agues.  
*Pl.* Small-pox, apoplexy, contagious fever.  
*Ed.* Measles, pleurisy, catarrhs, erysipelatos fever.
- Pl.* Small-pox, febris miliaris rubra, contagious fever.  
*Ed.* Measles, kink-cough, cholera, erysipelatos fever.
- Pl.* Small-pox, contagious fever, itch.  
*Ed.* Measles, dysentery.  
*Pl.* Small-pox, cholera, diarrhoea, contagious fever, itch.
- Ed.* Measles, erysipelatos fever.  
*Pl.* Small-pox, cholera, diarrhoea, contagious fever, coughs.  
*Ed.* Measles, dysentery, fever, erysipelatos fever.
- Pl.* Small-pox, and inter. fevers, an asthma, which changed into a swelling of the legs and abdomen.
- November.

- November.* { *Ed.* Measles, dysentery, fever, effects of cold, erysipelatos fever.  
*Pl.* Epilepsy, swelling of the salivary glands, slow fevers.  
*Nor.* Rheumatism, gout.
- December.* { *Ed.* Measles, dysentery, fever, effects of cold, erysipelatos fever.  
*Pl.* Nervous putrid fever, coughs.  
*Nor.* Hæmoptoe, catarrhus fev. with pleurisy.
- 1736.* { *Ed.* Measles, fever, effects of cold, erysipelatos fever.  
*January.* { *Pl.* Apoplexy, swelling of the salivary glands, coughs.
- February.* { *Ed.* Measles, pleurifies, rheumatic fevers, erysipelatos fever.  
*Pl.* Angina, pleurisy, peripneumony, kibs of the feet.

IV. Diseases which happened at any one of the Places mentioned, and not at the others.

- Edinburgh.* { *Bast.* Small-pox, August 1731, May 1733.  
 Dysenteries, August 1731, harvest months 1733, Sept. Oct. 1734, that winter, Oct. Nov. December 1735.  
 Erysipelas, lematodes, March, April, May 1732.  
 Fever amongst children, March 1732, April 1735.

Rubeolæ, June 1732, October Nov. 1733.

Contagious fever, from Feb. to Sept. 1735.

Itch, July Aug. 1735, Jan. 1736.

Epilepsy, November 1735.

Asthma, which changed into a swelling of the feet, and abdomen, Oct. 1735.

Perniones, Feb. March 1736.

Hæmoptoe, Jan. July 1732, March, Dec. 1733, Dec. 1735.

Stone and gout, Feb. March, June, Nov. 1732, March 1733, Jan. 1734, Jan. 1735.

Rippon. Inflam. of the intestines, January 1734.

Your orders to make only a comparison of the changes in the atmosphere, and of the diseases in these several places, during the years when registers were kept, I understand as a caution not to pretend to determine the relation between the observable changes of the atmosphere and diseases, which requires to be considered by one of much more knowledge and experience than

*Your most obedient Servant.*

V. Proposals



them, when weights just sufficient to make them straight are hung to them. He thinks of the head the most proper for the purpose, as being the most simple uniform animal fibre of any that he knows, and which may have nearly of the same strength. That very small degrees of contraction may be the

more sensible, the hair *a r* may be fixed to the lever *b c*, made of a fine knitting needle; which lever being fixed to a certain point at *b*, the contraction of the fibre *a r*, if but a  $\frac{1}{10}$ th part of an inch, may make the lever rise



at the end *c*. By this means he has found a long slender untwisted fibre of hemp to lengthen on moistning, and not to shorten, as it is commonly said vegetable fibres do, because twisted ropes do so for obvious reasons.

To determine the doses of attenuating medicines, and of such as thicken or coagulate the blood; dissolve the same quantity of the different medicines in the same quantity of their several proper menstrua: Put a determined quantity of one of these solutions into a phial,

and then fill it up with blood to the top, into which a capillary tube of glass is immediately to be luted; so that no blood can rise out of the bottle but through the tube. It is easy to see that the least rarefaction will be perceivable by the blood's ascending in the tube. The like experiment being made with each medicine, and the degrees of ascent being noted down in each experiment, you have the exact proportion which they bear to each other. To prevent any inaccuracy which the difference of heat and cold might occasion in these experiments, the solution should be brought previously to the animal standard of heat; the blood should be immediately let out of the vein into the bottle, and the same heat should be continued by the help of warm water, or a stove regulated by a thermometer.

Dr Hales, to whom I communicated this method of trying the degrees of expansion of the blood by medicines, and consequently the attenuating force, proposes to have at the same time the like quantity of attenuated blood in an open vessel, on which a glass bubble (such as the specific gravity of liquors is taken with) is put, whereby the alteration of the specific gravity of the blood may be seen; and the two methods may thus mutually give light to each other.

If this scheme is approved, I hope the gentlemen whose inclinations lead them this way will lend me the assistance; for so many experiments as are necessary would be too great an undertaking for one person, who can

not pretend to lay out his time wholly on such amusements.

*I. The good Effects of small Doses of Emetics and Purgatives frequently repeated; by Dr ALEXANDER THOMSON, Physician at Montrose.*

IN various indigestions in the stomach, and fluxions of degenerated humours to the chylopoietic organs, as also in the foulnesses of the lungs from a simple cough or asthma thro' their whole train of morbid consequences, where emetics and purgatives given in the common full doses have done no service, I have often found the same medicines taken frequently in small doses, of the greatest benefit, without being attended with any inconvenience.

The two medicines I have generally made use of in this way are the emetic wine among the emetics, and the tincture of *hierapicra*, of the class of purgatives.

The general rule I observe in ordering these medicines, is to divide into a number of small doses as much of either of the medicines as would be prescribed to the patient for a full dose; all which small doses are to be taken with proper intervals in twenty four hours, mixed with any proper vehicle suited to the nature of the disease. I continue this method daily. If the medicine occasions nausea, puking, or grips, or if the patient chuses some intermission, I forbear to give them a day.

To explain my meaning, I shall mention two or three of the many cases I have treated in this manner.

A girl of between nine and ten years of age used, toward night, and sometimes in the morning, to throw up a viscid, ropy phlegm of mucus from her stomach and from her lungs; her flesh became flabby, and her whole body weak and in disorder. She got sometimes the emetic, and at other times the purgative, in the manner described above, which cured her; and, having the same good effect in several examples, brought her at last to perfect health, which she has now enjoyed a great many years.

A poor man coughing mixt ulcerous matter, and emaciated to a great degree with the hectic symptoms, had six drachms of emetic wine mixed with lib. 2. *infus. succ. liquor. nigr.* given him, which he drank daily, in the nychthemeron. He had at times a transient nausea, puked and expectorated plentifully. After he was accustomed some days to his medicine, the nausea ceased, and the expectoration decreased. I increased his daily dose of emetic wine to an ounce, intermitting a day sometimes. The purulent expectoration gradually went off, and he recovered.

A lady of a bad habit of body and low spirits had long laboured under ropy variegated vomitings in the mornings, with expectoration suited thereto. After I had treated her with emetics, purgatives, and other medicines in the ordinary way to little purpose, I gave her in twenty four hours different small doses

the *infus. hieræ picræ*, till, from a small spoonful, I increased the quantity she took in the day to a spoonful and a half and two spoonfuls, always refraining the use of it when she found any stirrings in her belly, till they ceased. Sometimes likewise I mixed a little Daffie's *elixir*. By these means she recovered. Lately she fell again into the same way, tried the purgatives in common doses without success, but recovered again by the use of the small doses.

VII. *Powder of Tin an anthelmintic Medicine; by Dr CHARLES ALSTON Professor of Botany and Materia Medica in the University of Edinburgh.*

THE powder of tin has been used here for many years as a remedy against worms, and particularly the flat kinds, which often times elude the force of all other medicines; but few being acquainted with the proper dose, and manner of administering it, upon which chiefly its success depends, it is still less regarded than it deserves.

In 1719, the following empiric receipt came into my hands, and was the occasion of my trying the effects of this powder; which were so remarkable, that, though I never concealed it, I think it not improper to publish it more effectually, and to recommend it as a most valuable remedy for this loathsome disease.

A receipt for the fluck-worm.

“Take an ounce and an half of pewther metal, and grind it small to powder; take half a mutchkin

mutchkin of treacle, and take your powder and mix both together. The Friday before the change of the moon, take one half of it, and the day thereafter take the half of the other half, and the Sunday thereafter the rest of it on the Monday purge."

Thus I use it for the *tania intestinorum prima Plateri*, or tape-worm, and *tania altera ejusdem*, (*prax. 3. c. 14. p. 897.*) that is the gourd-worm, or fluck-worm. To full grown persons, I give two ounces of the powder of pure unmixed or block tin put through the finest hair sieve or sear, mixed with eight ounces of the common treacle or molosses, as directed in the receipt, having first purged the patient the preceeding Thursday, with an infusion of fenna and manna in a decoction of grafs-roots, to empty the guts. On Friday morning, I give to the patients, with an empty stomach, an ounce of the powder, in four ounces of the molosses. On Saturday morning I make them take half an ounce of the tin and two ounces of the molosses, and as much on Sunday morning. On Monday they are purged again with the same infusion. Though probably there is nothing in the day, yet I thought it not amiss at first to follow in this the direction in the receipt, and finding the medicine succeeded beyond expectation, I never altered it.

I had only once an opportunity of giving for the tape-worm; it was to a woman above thirty, who having been long troubled with this disease, had taken many medicines for it and among the rest small quantities of the powder frequently. She had oftentimes purged

fragments of the worm, and was far gone in a hectic consumption. The powder seemed to bring away all that remained of this tænia; for she was never more troubled with it. The consumption however continuing, at last carried her off.

I have prescribed it several times for the gourd-worm, and it never failed to complete the cure. I shall mention one remarkable instance. A man of about thirty six years of age, who had laboured under this distemper for many years, and had taken almost the whole class of anthelmintics, by a late very learned physician's order, to no purpose; for, as he told me, he always passed fewer worms when he took his medicines than at other times. By my advice he got the powder as above, and was cured in five days. The first purgative brought away a few: None appeared the three days he took the powder and molasses, nor with the first stool after the second purgative; but, in the second stool he said he thought all his guts were coming away, and it was all crawling full of these ugly vermin. For his own satisfaction, I made him repeat the course a moon after; but not so much as one worm was to be seen in his stools, nor did he ever observe any afterwards.

I need say nothing of the use of this powder against the *lumbrici teretes*, or long and round worms, it being sufficiently known and common in practice. One thing however deserves to be remarked, viz. That it is the most immediate cure for the pain in the stomach, which worms sometimes cause, that I know, though

though it brings them not away for some days after.

The dose of this medicine for children is to be regulated by the same rules, as purgatives and other medicines are.

Though the powder of tin may be several ways hurtful to worms, yet its efficacy seems chiefly to depend on its getting betwixt them and the inner coat of the stomach and intestines, so as to make them quit their hold; so that purgatives may easily carry them away with the fœces.

VIII. *The Effects of the Succus Rad. Irid. palustr. observed by Mr CHARLES RAMSAY, Surgeon in Edinburgh.*

**A**Bout the middle of April 1736, John Murdoch, formerly an healthy man, going some miles into the country, went into a low damp house, and happened to drink some sour ale, when it was a little warm. A few days after, he complained of a general stiffness over his body, and an oedematous swelling on his face and breast, which was carried off for that time with proper diaphoretics and hydragogues.

Towards the middle of August thereafter, the swelling recurred, affecting his whole body, and was brought on by a severe cold he got at sea. Drs Rutherford and Dundas attending him, ordered a great many hydragogues, diuretics, &c. which only served to mitigate the symptoms, but never effected any thing like a cure.

By the 20th of September the disease increased so fast, as to render his body of so huge a size as scarce to be known by his acquaintance to be the same man.

On the 25th, he turned very feverish, delirious; asthmatic, and was affected with epileptic fits, and so monstrously big and stiff, as not to be able to move any joint in his body, excepting when he had a fit.

Immediately he had large blisters applied to his head and back; incisions made in his scrotum, legs, and arms; from all which there was a plentiful evacuation.

By this time the strongest cathartics, such as jalap and mercury, gamboge, &c. were turned quite ineffectual: Whereupon Dr Rutherford ordered to make trial of the *succus radicis iridis palustris*, which was directed to be given first to the quantity of 80 guts every hour or two, in a little syrup of buckthorn, which had very immediate effects, making him pass several Scots pints of water by stool that very night.

Next morning it began to lose its effects, and was gradually increased to the quantity of two drachms every two or three hours, and at last, mixed with a fourth part of syrup of buckthorn, was given by spoonfuls, as he was able to subsist under the purging: So that, in the space of three days, we computed (from the blisters, incisions, and purging) he might have passed near thirty Scots pints of watery stuff.

Several days after, the juice was continued in smaller quantity, till, by the purging and other

other evacuations, he was reduced to a perfect skeleton: Afterwards he was laced in flannel, smoaked with amber and mastick, got strengthening medicines, pickt up, and continued pretty easy, till the latter end of November, when he relapsed, turned feverish, and died apoplectic.

IX. *Observations of the Effects of Lignum Guaiacum in Cancers; by Mr JOHN LOVE, Surgeon at Greenock.*

THE virtues of the lignum guaiacum in the cure of venereal disorders, particularly in ulcers from that cause, have been much commended, but I don't know that it has been thought to have so good effects in cancerous fores. I shall not say that in such cases the guaiac will generally make a cure; but, from what I observed in two patients, I should think it worth while to make trial of it.

Isabel Chambers, about thirty years of age, had been long in a bad habit of body, having had several running fores upon her: After they were healed up, a very large hard indolent tumor formed in her left breast, which in eight months increased to a great bulk, broke, and became a plain ulcerated cancer, for which I amputated the whole breast.

Several days after the operation, she sweated plentifully; and the suppuration went very well on; the sweating then ceased, and some days after, the lower part of the wound looked in a gangrenous way, which I got removed with great difficulty, by scarifications, and by the

the use of strong antiseptic fomentations and cataplasms, and by giving the bark and some claret; but the matter of the sore continued ichorous, and a little knot of white colour rose a little below; upon opening of which, instead of pus, I found a substance resembling cheese. This little sore put on an appearance between gangrene and cancer, with a swelling between it and the larger wound, which was now about the breadth of a crown piece. I pursued the same method which had been successful before in the larger sore, and tried several other medicines, but with so little success, that this lesser sore became more painful, worse coloured, and an inflammation and hardness were brought on the surrounding teguments. I then made her drink six pounds a day of a decoction of guaiac, in which four ounces of the raspings were long boiled, till the decoction was four pound, and I gave her some theriac at night to make her sweat. These medicines not having the effect I desired in three days, I purged her with *piuat. coch. gr. xxv. mercur. d. gr. v.* continuing still the decoction of guaiac. After this her sweating returned plentifully with the use of the guaiac. Instead of the former fomentations and poultice, I now applied the following: *R. Rasur. lig. guaiac. unc. viii. Herb. aromat. M. vi. M. coq. ex aq. font. q. s. Ad. colatur. lib. iv. p. fotu. R. Colatur. hujusce unc. vi. Acet. vin. alb. unc. ii. Farin. sem. lin. unc. ii. Fanugrec. unc. i. aven. s. q. Coq. ad consistent. cataplasn.* and I put a pledget spread with *liniment. Arcaei. part. viii. ol. terebinth. part. i.* on the fore.

By

By the use of this liniment, poultice, and fomentation, a skin was brought on the parts in a little time.

A woman about the time of life when the menses generally leave that sex, had several hard, painful, itchy tumors in the orifice, of the vagina; several of them suppurated, but left a hard stool behind them; at last, besides several smaller ones, the size of peas, one increased to the bulk of a small walnut; its colour was livid, and it was very hard; she had such itching and pain in it, that she could scarce refrain from tearing herself to pieces; by scratching, she broke the surface of it, which discharged a bloody-coloured serum.

By the use of the decoction, fomentation, and cataplasim mentioned in the foregoing case, except that I added a little sal ammoniac to the poultice, she was cured.

X. *Of the Effects of the Peruvian Bark in Gangrenes, Ulcers, and Small-pox; by ALEXANDER MONRO, Professor of Anatomy in the University of Edinburgh, and F. R. S.*

**T**HAT no man ought to be tempted, by any view of private reputation or gain, to conceal what can be for the general benefit of mankind, is a principle which I know the gentlemen of your society maintain, and their practice is conform to it. Letters, which I have received from several gentlemen at a distance from this, informing me that I have got an infallible secret for the small-pox, and begging I would send them some of the medicine, whatever

price it is, make me afraid of having a character you justly think so condemnable. Relating what I know on the subject in public lectures and private conversation, is not sufficient, it seems, to keep away this imputation from me; I am therefore obliged to apply to you to publish the observations I have made on the use of the Peruvian bark in the small-pox, which is the only medicine I have employed in this disease that is not commonly prescribed.

After the good effects of the bark in gangrenes were known, I had occasion to use it several times in that disease with success, and sometimes, by necessity or choice, gave it in an injection by the anus, rather than by the mouth, as I had likewise formerly done in agues. The quantities given in clysters were larger, but the effects were the same. One cure of a gangrene made, I think, by the bark in clysters, seems to me so remarkable, that I must tell you the history of it.

A young gentleman, very healthy in appearance, had strained his left hand, but had no uneasiness in it for ten or twelve days; at the end of which he was suddenly seized with a very sharp pain near the *os pisiforme* of the wrist, and soon after the teguments on the anterior part of the metacarpal bone of the little finger swelled: He neglected to ask advice for two days; then some student who saw it, observing a mortification begun, scarified the skin, fomented the part, and applied some digesting ointment with oil of turpentine; which dressings were continued also the third day.

On the fourth day, when I saw him first, teguments covering the short muscles of the little finger were all mortified; his pulse was so low, that with difficulty I could feel it, and it was so quick that I could not number the beats of it. He had a general tremor over all his body, the *subfultus tendinum* was very frequent; he had a constant anxiety, restlessness, and delirium; his tongue was parched and dry, and whatever food or drink he swallowed was vomited before it almost got down to his stomach. The gangrened parts were again scarified and fomented, their edges were dressed with warm *ung. basilicon*, to which a small proportion of oil of turpentine was added, and a poultice of *theriaca andromach.* was put over all. Soon after his great cuts were emptied by a laxative clyster, and as soon as the operation of this was done, five ounces of warm milk, and a drachm of the powder of Peruvian bark were injected, which he retained. Four hours after, the milk and bark were repeated, and two such more injections were given in the night-time.

Next morning he had no raving, tremor, subfultus or vomiting, and his pulse was stronger and slower. The hand was dressed as the preceeding day, and the injection with the bark was repeated. In the afternoon, it was changed, upon the patient's desire, for a bolus of half a drachm of the bark, which was repeated every four or five hours. The fever ceased, the gangrened parts began to separate next day; and the bark being continued several days, the cure went on without any further accident,

ident, except that he was put to a good deal of pain one day by an application of ill prepared *aqua phagedanica*. This I mention to have an opportunity of warning the younger surgeons not to make use of that medicine, unless when the lime-water is strong enough to make the solution of the corrosive sublimate mercury to turn turbid, and to precipitate in form of a very fine red powder; for, if the lime-water is effoete, and remain clear after the sublimate is mixed with it, instead of a very mild medicine, they are to expect all the effects of unaltered corrosive mercury.

In all the gangrenes where the bark was given with success, I observed that it brought on a mild suppuration, which I saw become worse when the use of the bark was interrupted, and then turned of a good kind, when the bark was again given. This made me join in opinion with others, that it would also be of good service in several sores where the suppuration was faulty: Experience proved we judged right; so that the bark became a common and a beneficial medicine in this town for such sores.

This effect of the bark in procuring a kindly mild suppuration, led me to imagine it might be serviceable in the small-pox of a bad kind, where either a right suppuration did not come into the pustules, or petechiæ shewed a disposition to a gangrene; and I had the pleasure to see the effects I expected from it in several variolous patients to whom I gave the bark; the empty vesicles filled with matter, watery sanies changed into thick white pus; petechiæ became gradually more pale-coloured, and at

last disappeared; the blackening of the pox began sooner than was expected. I no sooner had the good effects of the bark in the small-pox ascertained by trials, than I spoke of it to other gentlemen in practice here, some of whom had reasoned in the same way I had done; and had been giving it to their patients with success, since which I have had thanks from some of my friends in the country to whom I recommended this practice.

I gave at first the decoction, and then the extract of the bark; afterwards I forsook these weaker preparations for the fine powder, which was mixed with some mild rich syrup, and an aromatic distilled water, both which may be varied as the patient prefers one sort of taste to another. In this form from ten to forty grains were ordered to be swallowed every four or five hours.

But, as several children could not be prevailed on to take it by the mouth in any form I could contrive, and, through fear of having this medicine given, would taste neither food or drink, there was a necessity of using the other form of clysters. Previous to giving the bark this way, the great guts were unloaded by a laxative injection; and then from half a drachm to two drachms of the jesuits powder was injected, with a small quantity of warm milk, to which some diascord, or syrup of poppies, was added, if the clysters were retained too short time. These injections were repeated morning and evening or oftner.

I have hitherto only given the bark in the small-pox after the eruption, and continued it till

ill the blackning was completed; but am persuaded, from the effects I saw of it in mitigating the secondary fever, that, if it is given during the eruptive fever, it might be of use in determining the small-pox to be of a favourable kind.

I hope what I have said will not be understood as if I recommended the bark as an infallible universal remedy in those diseases, and the only one that needs to be employed in them. So far from meaning any such thing, I assure you I have seen it fail more than once in both gangrenes and small-pox; and in general I know no medicine which is not capable of doing hurt to patients under some particular circumstances of the very disease for which it is given with the most success; thus in the small-pox, when the lungs are violently infarcted, I would not consent to give the bark: I have seen patients in this condition almost suffocated after a small dose of it.—They would also, in my opinion, do very ill who would trust entirely to the bark, neglecting the other medicines which have been used to advantage in the different circumstances of this disease. The bark would not surely moderate a very high, full, hard pulse with high breathing and inflamed brain in either eruptive or secondary fever of the small-pox, as blood-letting would do.—The bark could not clear the stomach and bronchiae of viscid phlegm as an emetic would.—It would not, single, calm the general spasm or relax the skin to make way for the eruption, as when assisted by a tepid bath:—Nor would it raise a sinking pulse, or discharge a load of viscid humours,

humours, as the stimulus of a blister and the suppuration after it will frequently do. In short, I pretend to recommend it no further than as an excellent assistant to nature in what the ancients called the concoction and maturation of the morbid matter, the effects of which appear in moderating the fever, and bringing a kindly mild suppuration, which are indeed grand articles in the cure of gangrenes, ulcers, and small pox.

XI. *A Method of preparing the Extract and Syrup of Poppies; by Mr THOMAS ARNOT, Surgeon in Cowpar.*

**A**FTER having had the experience of the good effects of an extract of the poppies which grow in this country, beyond what I have observed in opium brought from Turkey; and seeing what different strength the syrup of poppies is of, as it is commonly prepared; whereas its strength, and consequently its dose, may always be certainly known, if it was to be prepared by all in the way I have practised; I thought an account of the method of preparing this British opium might not be disagreeable to you.

That this medicine may be got to the greatest advantage, both as to quantity and quality, the culture and management of the poppies are to be taken care of. What I have found most successful, is to trench a spot of new rich ground, where poppies had not grown the preceeding year; for, if they are continued several years on the same ground, they

they degenerate; and, chusing the ripest and whitest seed of the great single-flowered Turkey poppy, I sow it in the month of March very thin and superficially, in drills at two feet distance each, to allow place for weeding, &c. As soon as the young plants spring up, I take most of them away, leaving only the strongest most thriving plants at about a foot distant from each other. When the heads of these come to their full growth, but before they are ripe, I chuse a calm warm sun-shine day to cut them off, at an inch or less distance from the top of the stalk; going backwards from the end of the rows I begin the lopping at, to the other end. The design of this caution is to save the milky liquor which rises to the cut part of the stalk, from being spilt by the motion which the wind, or my cloaths, would make, and that the heat of the sun may make it thicken soon. What heads are small, and with the appearance of growing larger, are left to be cut afterwards. All the heads thus cut off are put into a basket as they are taken off, and are allowed to ly there together two or three days, till the drops of liquor which run out of them thicken, and thereby are saved; after which they may be spread out on a floor, or hung up on strings to dry. Two or three days after, I in the same manner lop off such other heads of the poppies as are become large enough, and at the same time cut off pieces of two or three inches length from the stalks of those formerly cut. This cutting of heads and pieces of stalks, I perform every second or third day, till I observe no more juice

juice rise in the stalks, keeping them always in a basket some days, and drying them afterwards as the first heads were, that all the juice may be saved, only preserving some few of the best grown heads, and allowing them to ripen fully, that I may have seed for sowing next year.

The dried heads and stalks being cut and bruised, I infuse them some hours in boiling hot water, and then boil them three or four hours; after which I strain the liquor strongly out, and allow it to depurate, by the grosser parts subsiding for a day or two. The clear liquor which is poured off, I clarify with whites of eggs, and boil in the common way of making extracts, till it comes to the consistence of honey. Some of it I keep in this form, but I put the greater part near to a fire, or in *balneo arenæ*, till it becomes as thick as the extract of opium, taking great care that it shall contract no empyreuma. Out of five or six pounds of the dried heads and cuttings of the stalks, I have had a pound of the extract, which is of much less price than opium.

The dose of this extract must be double of what one would give of Turkey opium to answer the same intentions, which it does, without inclining patients to those ravings, or giving them the nausea and giddiness which common opium does. This I attribute to the grosser viscidous parts being separated by subsiding, and with the whites of the eggs.

I prefer the syrup of poppies made with this extract to any made in the common way; for, besides that I can make it with much less trouble

trouble than the common syrup, and therefore prepare it fresh more frequently than apothecaries will incline to make the common syrup, so that mine has no chance of turning sour, or of candying; mine has other advantages; for it does not ferment as the other does when moved, or in a warm place: And what principally makes me prefer it is, that I am certain to have it always of the same strength; whereas the dose of the other must be very uncertain, since different poppies have very different proportions of the narcotic juice.

In preparing the syrup with this extract, I mix such a proportion as that an ounce of the syrup shall contain two grains of the extract, equal to a grain of common Turkey opium.

That part of the decoction which I mentioned to be preserved in the consistence of honey, is nearly half so powerful as the extract, and is kept to save the trouble and time of dissolving opium or the extract, when prescribed in electuaries, liniments, plaisters, &c. where the opium requires to be intimately and equally mixed with the other ingredients of the composition.

XII. *A Dissertation on Opium; by Dr CHARLES ALSTON, Professor of Botany and Materia Medica in the University of Edinburgh.*

THERE has been so much written on opium already, by men of great figure in learning, especially within these hundred years, that it may be thought presumption in me to attempt any thing on the subject; a subject which

which the treatises of Hartmannus, Sala, Lemullerus, Wedelius, Jones, Mead, F. Hofmannus, Hecquet, &c. may well be supposed to have exhausted; to say nothing of the numberless writers of botany, *materia medica*, physic, &c. who have bestowed no small pains upon it. Yet this is so far from being the case, that there are many things relating to its history, as well as to its effects, either not at all touched, or ill vouched, by any author I have seen; so that many controversies about it still subsist. These I have endeavoured to determine by experiments and observations in the following paper, submitted to your censure. The method might be amended: But I chuse to retain it; because it is the same in which I delivered an abstract of it for many years in my private colleges, and which I follow on all the simples.

### S E C T. I.

Opium is the proper or milky juice, which issues from incisions made in white poppy heads thickened in the open air into a solid, but softish, resinous gum, of a dark reddish-brown colour; and of a very hot bitter taste, and strong, heavy, or soporiferous smell, brought from the Levant and East-Indies, in round flat cakes, or more irregular loaves, of different sizes, from four ounces to a pound and upwards in weight, and covered with leaves or other vegetable stuff, to prevent their running and sticking together.

So little is the history of opium, even at this day, sufficiently known, that, in this short description, there is scarcely one thing asserted which is not contradicted by famous authors; and therefore I am under a necessity to explain and confirm each part of it.

I. It is well known, that a milky juice flows from poppy heads, when hurt or wounded; that this bears a very small proportion to the juices got by expression, and widely differs from them in taste, smell, and qualities; also, that the opium of the antients was made of the milk, and their meconium of expressed juices, or of the decoction of one and the same plant; and that, in their opinion, the meconium was *multum opio ignavius*. But it is disputed, whether the opium now used is the true opium, or the meconium only.

On the one hand, it is affirmed by Garcias ab Horto, Bellonius, Mandelslo, Tavernier, and, to name no more, by Dr. Kempfer that our opium is the milk drawn from poppy heads by incision, or is the same way prepared as was the opium of the antients, according to the account Dioscorides and Pliny have given of it. The manner of collecting and preparing the opium being more circumstantial in Kempfer's *amœnitates exoticæ*, (which is not in every one's hand) than in any author I have met with, I have transcribed it on the margin in his own words \*. This author, having lived  
two

\* Papaveris albi sativi succum Europa Opium, Asia cum Ægypto Asiun & Osiun vocat. Persia idem præparatum, ex reverentia, appellat Theriaki, i. e. theriacum;

two years in Persia, and, being a diligent and curious inquirer, could not but know how opium is made there; and his character forbids in the least to suspect his veracity.

“cam; nam hæc illis est poetarum illa Galene, Hilare  
 “et Eudios, id est, medicina animo serenitatem, hilaritatem  
 “et tranquillitatem conferens: Quo olim tergemino elogi  
 “theriacale antidotum Andromachi appellatum legitur  
 “In Perside, collectio ejus celebratur per ineuntem aestatem  
 “propinqua maturitati capita decussatim sauciando per for  
 “perficiem. Culter negotio servit quintuplici acie instruc  
 “tus, qui una sectione quinque infligit vulnera longa par  
 “lela. Ex vulnuseulis promanans succus postridie seorsum  
 “pro abstergitur, & in vasculum, abdomini præligatur  
 “colligitur. Tum altera capitum facies eodem modo vici  
 “neratur, ad liquorem pariter proliciendum. At hæc col  
 “lectio, ob capitum impar incrementum & magnitudi  
 “nem, aliquoties in eodem arvo instituenda est. Solent  
 “in plantis nimium ramosis supersua capita prius amputa  
 “ri: sic reliqua magis grandescunt, & succo implentur ma  
 “joris efficaciæ. Primæ collectionis lacryma, Gobaar die  
 “ta, præstantior est, & graviori pollet cerebrum demul  
 “cendi virtute, colorem exhibens albidum, vel ex luteo  
 “pallentem; sed qui color ex longiori insolatione & ma  
 “ditate infusari solet. Altera collectio succum promit  
 “priori, ut virtute, ita pretio inferiorem, coloris plerum  
 “que obscuri, vel ex rufo nigricantis. Sunt qui et tertiam  
 “instituunt, qua obtineatur lacryma nigerrima, et exigua  
 “virtutis. Præparatio opii potissimum in eo consistit, ut  
 “aquæ pauxillo humectatum, spatha crassa lignea continetur  
 “& fortiter ducatur & reducatur in patina lignea & planetur  
 “donec elaboratissimæ picis consistentiam, tenacitatem, &  
 “nitorem induat. Ita diu multumque subactum, ad usum  
 “mum manu nonnihil pertractatur nuda, & demum, in  
 “cylindros breves rotatum, venale exponitur; forcipe  
 “videndum, cum particulas emptores petunt. Hæc solent  
 “pertractatum opium appellatur Theriaak malideh, i. e. theri  
 “iaca molendo præparata, vel etiam Theriaak asiuun, id est  
 “theriaca opiata, ad differentiam theriacæ Andromachi  
 “quam illi vocant Theriaak Farunk. Massa hæc sæpius  
 “mero, non aqua, sed melle subigitur, ea copia admixta  
 “quæ non siccitatem modo, sed & amaritatem temperet: hæc

And, on the other hand, it is as positively asserted by not a few authors of name, That the opium of the shops is nothing but a meconium. Thus Prosper Alpinus, a noted botanist, who was three years in Egypt, says, 'opium, quo omnes utuntur, ex locis Saieth, ubi olim Thebarum urbs erat præclarissima, deferunt; ibi enim nigra papavera copiosissimè proveniunt, cæterisque omnibus facultate præstant, ex quorum capitibus succum exprimunt, quem sole siccant, atque ad usum servant; Med. Ægypt. l. 4. c. 2. Again, according to Mr Lemery, the opium en larme ne se trouve en aucune endroit.'

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No

hæc specialiter appellatur Bakhra. Insignior præparatio est, qua inter agitandum adduntur nux myristica, cardamomum, cinnamomum, et macis, in pulverem subtilissimam redacta; qualiter præparatum opium cordi et cerebro insigniter prædesse creditur. Vocatur in specie Polonia, vel, ut alii pronunciant, Polonia, puta Philonium Persicum, seu Mesue. Ab omnis aromatis, tantum croco et ambra massam infarciunt. Præter hoc triplicis præparationis opium, quod sola pilularum forma deglutitur, prostat, vel etiam a domesticis conficitur, liquor celebris nominis Coconar dictus, Græcorum quod puto *μυκωνοειδης*, ac Homærianum Nepenthes, quod a bibaculis propinari assæm per horarum intervalla solet. Parant hujus (hunc) liquorum alii ex foliis, aqua simplici per brevem moram coquendis; alii ex capitibus contusis infusione macerandis, vel iisdem supra filtrum repositis, aquam eandem septies octave superfundendo. Admixtis pro cujuscunque placito, quæ saporis gratiam conciliant. Tertium addo opiatum genus, electuarium latificans et latificando inebrians; cujus basin idem opium etiam constituit, quod a seplasiarum et medicis, prout quisquis ingenio pollet, varie elaboratur, ac diversis ingredientibus ad roborandos et exhilarandos spiritus dirigitur: unde varix ejus extant descriptiones; quarum primaria et rationissima est, quæ debetur inventori Hassem Begi, quandoquidem comedentis animi miris perfundere gaudiis, et magicis cerebrum demulcere ideis et voluptatibus dicitur." Kempfer. Amœn. exot. Fasc. 3. Obs. 15. p. 639. et 642. 3. 4.

No traveller, says he, boasts of his having met with it among the curious ; all who have seen the Turks of the best quality take opium, say it did not appear different from what is brought to us, &c. and concludes, That there is no other opium than the meconium, or the extract of the leaves and heads of the poppies of Egypt, which is sent to us under the name of opium, formed into cakes or loaves, covered with poppy-leaves (*v. Dict. des drog. in opium*). Mr Savary, in his *Dict. de Commerce*, is of the same opinion. And, to mention no more, Mr *de la Condamin* also affirms, that no true opium, that is, the juice of poppy-heads drawn by incision, is to be found at Constantinople. "I am assured," says he, by those who ought to know it best, "that it is all an extract of a decoction of the "poppy. The opium most esteemed is of a penetrating smell, of a very deep greenish-brown colour (*verd-brun tres fonce*) on the outside before it is dried ; but yellower and clearer within. The greatest part of that sold at Constantinople is brought from Natolia. Opium grows also in the territory of Thebes in Egypt ; but even there the Natolian is preferred, red, and sells for double the price of that of the country." (*Vid. Mem. Acad. Roy. 1732, p. 421.*) To these testimonies if we add from Pet. Bellonius (who travelled for two years in Natolia, Egypt. &c. and declares he related nothing but what he saw) the marks of the best opium\*, and its low price, we will be re-

\* "Opium optimum est amarum, gustu calido fauces  
condens, flavesceus, leoninorum pilorum modo ; in su-

dy to conclude we have nothing but the meconium.

But that our opium is neither an extract, nor an inspissated expressed juice of poppies, may be demonstrated by arguments which to me appear unanswerable. For, 1. The milky juice drawn by incision, from poppy-heads, and thickened either in the sun or shade, even in this northern country, has all the characters of good opium; its colour, consistence, taste, smell, faculties, phenomena, are all the same, only, if carefully collected, it is more pure, and more free of feculencies. To obtain this tear, I first followed the directions of Dioscorides, and, on a clear dry day, before noon, cut off the asterisk, as he calls it, (*capitellum, operculum, tuba, or stigma*, among the botanists), or crown of the poppy-heads, so as to avoid penetrating into the cavity of the fruit, and collected the pure milk, with a little silver spoon and my finger, into a china tea-cup. I made choice for this purpose of poppy-heads come to their full bigness, and before they began to harden or dry. The juice soon thickens (a small quantity in a day or so) to the consistence of opium, in the open air. It was of a fiery, hot, and very bitter taste, and soporiferous smell; both hotter, and more strong-scented than the common opium; of a dark, yellowish brown colour on the outside, somewhat lighter within when broken,

I 2

and

“*sam veluti ex granulis diversi coloris coactum. Legendo  
“enim opium ea grana in papaveris capitibus collecta cohaerent, et in placentulam quodammodo coeunt.*” Lib. 3.  
•bf. 15.

and not all of the same colour, but as it were composed of drops. I have of it by me, and, tho' now more than ten years old, it retains both its colour and taste, tho' it is not so strongly smelled as when new. This was the first specimen of *Bellonius's opium optimum* that I ever saw; may it not be called *opium en larme*? And, if it may, sure I am it may be found every where. This was from the *Papaver ~~horrense~~, semine albo*; *sativum Dioscoridi*; *album Plinio*, C. B. Pin. 170. or white poppy. About the same time, I gathered opium also from the *papaver vulgare, cujus capitula foraminibus hiant, semine incano*; *αργιότερον Dioscoridi*. C. B. Pin. 170. or wild poppy. It was a little lighter-coloured; but this I thought accidental only, for the milk turns soon black on the knife, and so may colour some part of the juice more than another; and in nothing else they differed.

I made trial afterward of the Persian way of making opium. I had not the five edged knife, but, as quickly as I could, superficially scarified one side of the poppy-heads in four, five, or six places, according to their bigness. Next day, when the juice was as hard as opium, I scraped it off, and kned it together, so could not discover any thing like drops in it. Notwithstanding all my caution, it sometimes penetrated the head, and some few drops fell to the ground, both which would have probably been prevented, had I been furnished with a right Persian knife. Yet I found that I was able to collect considerably more this way in the same time than in *Dioscorides's* way. That I might have the true tear as clean,

clean, free of dust, and fair as possible, I cut off the ~~stem~~ of several heads, and bending them down, suffered the milk to drop into a tea-cup; then let it in a window, being well covered with paper; when it was as solid as opium, I scraped it out, and pressed it into a lump. It is altogether of the same colour, and the whitest I ever saw. I made use of the white poppy for these experiments also, and repeated them on several varieties of the poppy, both with the white and with the black seed, without observing any difference in the juice.

*Secondly*, Both the extract and the thickened expressed juice differ very much from opium, yea scarcely any way resemble it. I caused both to be prepared, but neither of them has so much of the taste or smell of opium, that any one could know thereby that they were all got from the same plant. The brown extract is black when dried, as is also the green inspissated juice; but, when diluted, the former is brown, the other green. The extract is pretty tough and sticking; the juice is rough and more friable. Both were evaporated in a gentle sand heat; the juice beginning to turn mouldy in two days after expression, tho' kept in a dry place and broad basin. I own some part of either of these may be mixed, in some places, with the true opium. Mr Condamine's Verd-brun opium may perhaps have some of the expressed juice in it, but it cannot be much, for the reasons following; and probably it is some other aromatic substance ~~that~~ gives it the penetrating

netrating smell, which it cannot derive from the poppy.

*Thirdly*, The common opium contains more rosin or sulphurous parts than either the expressed inspissated juice, or extract of poppies can possibly do. For, as will appear below, about the third part of the common opium, as well as of what I made, is rosin or sulphur. Of the extract and thickened expressed juice, not a tenth part is sulphurous; for tho' alcohol extracted somewhat more than  $\frac{1}{10}$ th, yet it was scarce tintured by them, and precipitated nothing in water.

*Fourthly*, If opium was not the true tear, there needed not be so many large fields sown with poppies as there are in Natolia, Egypt, Persia, &c. Neither would opium be so strong a medicine as it is; its virtues, as an anodyne, depending chiefly, if not entirely, on the proper milky juice.

The objection taken from the price of opium appears to be of no force; because I could have collected here, without the Persian knife, and that dexterity which can be acquired only by use, notwithstanding the climate, and the consequent smallness of our poppy-heads, in an hour's time, about a drachm, or so, of opium. I should wonder therefore, that none of these French gentlemen tried to make the opium and meconium at home, Bellonius having given the hint, and Quercetan proved it practicable. In the mean time, I conclude, That opium is, at least for the far greatest part, the true tear of the poppy.

*2do*, Another controversy is, whether opium is got from the white poppy or from the black. The

The ancients seem to have believed it was prepared from the black ; Pliny says expressly, *Alterum genus est papaveris nigrum, cujus scapo inciso lacteus succus excipitur.* (l. 91. c. 8.) And elsewhere (l. 20. c. 18.) *E nigro papavere sapor* (or *sapor*) *gignitur, scapo inciso.* The learned Dalecampius, in his annotations on this last cited place, remarks, that *E nigro, potius quam albo papavere, opium fieri nusquam Dioscorides scribit.* *Valentius, E nigro colligi verisimile est, imbecillius ex albo.* *Bodæus a Stapel. in Theophr.* (p. 1100.) is of the same mind, and many others : Yet Dioscorides not only writes, that the poppy with the black seed is called by some, *ροίας*, δια τὸ ρεῖν ἐξ αὐτῆς τὸν ὀπὸν, because the juice flows from it ; but also, after giving the virtues of the seed, *της μελανης μεκωνος*, of the black poppy, he immediately adds, *ὁ δὲ ὀπος και αὐτος ψυχων επιπλεον, και παχυων, και ξεραινων*, &c. But the juice itself is more cooling and incrassating and drying, &c. viz. than the seed of the same black poppy ; hence, since he nowhere says the *οπος* is got from the white, Pliny (if he copied Dioscorides) seems to have understood him as well as these modern critics. But, whatever is in this (I think it of no consequence, whether from the black poppy or white with regard to the medicine, though of great consequence with regard to the opium-maker ; every poppy-head yields the same juice, but every poppy-head does not yield the same quantity ; a small head cannot contain as much as a big one. Interest therefore will direct every where to cultivate for opium only such poppies

as bear the largest and most juicy heads in the country, and consequently, so far as I know, the white: And we find in fact, that it is from the white poppy they get the opium in Cambay (Garcias) in Persia, (Kempfer) in Paphlagonia, Capadocia, Cilicia, and other places of Natolia, (Bellonius) and probably also in Egypt; for Bellonius, who was in Egypt, takes no notice of the opium of that country being got from a different kind of poppy; And what Alpinus relates is not as from his own proper knowledge, consequently he might be misinformed, as he was in the manner of making opium, so also in the plant that affords it; or he might run into the mistake, by implicitly following Pliny, Apuleius, or Avicenna.

3tio, As to the choice of opium, I shall pass it as known, (*V. Wedel. Opiol. l. 1. c. 4.*) all the controversies concerning it, as, whether soft or hard, brown or black, old or new opium, &c. is to be preferred, as of no moment, and easily determined by the following experiments. But, since Dioscorides writes that opium is sophisticated several ways, and Bellonius tells us that the merchants *Opii quantitatem augeant* before it is distributed among the provinces; may be asked, whether all the opium we use is from the poppies, or whether any other drug is mixed with it, such as glaucium, gum, juice of wild lettuce, and suet or tallow, all mentioned by Dioscorides? Tho' I cannot answer this question with certainty, yet I think it probable that nothing is mixed with it, if it be not a small quantity of some innocent liquid or a milky juice of the same nature with the

of poppies, otherwise it would be weakened, or made stronger as what we make here. I know not the glaucium of the antients, nor did I ever see any opium that I had reason to suspect as adulterated with gum or suet; but the wild lettuce, that is, the *lactuca sylvestris*, odore viroso, C. B. Pin. 123. abounds more than any poppy I know with a milk of the same taste and smell; perhaps therefore this, if it can be more easily collected, may still in some places be mixed with opium, and the medicine be nothing the worse for it, the milk even of the common lettuces being anodyne and somniferous, as well as that of the poppies.

4to, I said opium comes to us covered with poppy-leaves, &c. because every author says so; but what I have seen here is covered with the flowers, seeds, chaffy husks, &c. stript from the stalks of some of the lapatha or dock kind.

## S E C T. II.

*Opium et Opium Thebaicum*, Off. οπιος μηχανισμος et ὑπνωτικον μηχανισμ, Hippocrat. morb. mul. 1. 2. μηχανισμος οπιος Dioscorid. 1. 4 c. 65. Galeni, Simpl. Med. 1. 1. c. 12. § 13. Oribasii, 1. 15. Opion. Plinii, 1. 20. c. 18. οπιον, Galeni De comp. med. § loc. lib. 3. c. 1. Pauli, 1. 7. opium. Acosta Clus. Exot. 257. Bellonii, bid. 178. C. B. Pin. 494. I. B. 3. 392. R. H. 1854. Opium Mauritaniæ et Indis osium, Lusitanis Amfiam Garciae, Clus. Exot. 154. Opium, quod Asia cum Egypto Asiuum et Ofiuum vocat. Kempfer. Amoenitat. Exot. 642. Opium.

Papaver,

Papaver, et papaver album. Off. papaver horten-  
tense femine albo, fativum Dioscoridi, album  
Plinio. C. B. Pin. 170. papaver fativum Dod.  
445. I. B. 3. 390. R. H. 853. papaver fativum  
album, Ger. emac. 369. papaver simplex, fati-  
vum, album. Park theat. 365. papaver horten-  
se. H. Ox. 2. 275. papaver album, fativum, Kemp.  
Amoen. Exot. 639. papaver foliis simplicibus,  
glabris incis. Lin. H. Cliff. 200. The white pop-  
py.

Opium or opion, now the most common name  
of this juice, was, I believe, given it by Pliny,  
Galen being the first among the Greeks I have  
seen that use it. For the etymology and vari-  
ous significations of *οπος, μνηκων*, &c. I refer  
to Wedelius (*Opiolog.* l. 2. c. 1.) and Bodæus  
a Stapel. (in *Theophr.* p. 591. 965. 1097, &c.)  
If there was any difference between the *οπος*  
*μνηκων* and *ὑπνωτικὸν μνηκωνιον* of Hippocrates,  
the last probably was the meconium of Diosco-  
rides, or rather of Pliny.

That opium was known to the antients no  
body denies; but, whether the Greeks or Egyp-  
tians were the inventors, is a question not yet  
determined; what seems most probable is, that  
this honour is due to the Greeks, and that its  
soporiferous quality at least was discovered, if  
not by Hippocrates himself, not long before him;  
for, tho' he mentions the *οπος μνηκων* and *ὑπ-*  
*νωτικὸν μνηκωνιον* too, yet it is only in one page,  
(viz. de morb. mul. l. 2. p. 673. lin. 24. and 27.  
edit. Foes) and the same disease *suffocatio*  
*uteri*, that he notices the internal use of either.  
Again, tho' the anodyne quality of opium re-  
commended

commended it very early in some distempers of the eyes and ears, yet Diagoras, who was a disciple of Democritus, and consequently almost contemporary with Hippocrates, condemned this practice, as Dioscorides informs us, *δια το αβλῶδες εἶναι καὶ καρωτικόν*, because it dims the sight, and causes a lethargy, or continual desire of sleeping. Hence I think opium was then a new medicine, and its virtues not well known, otherwise Hippocrates would not so seldom have used it, nor Diagoras made its soporiferous quality an argument against its application. I might add, that Heraclides of Tarentum, who flourished 2 or 300 years after Hippocrates, is generally owned to be the first on record who prescribed opium with these intentions.

I know it is the opinion of many learned men, (of whom, so far as I know, Theodorus Zwingerus, who died about 1588, was the first) that opium was the *Nepenthes* of Homer, (*Odys. 4. v. 217. &c.*) which Helena had learned of the Egyptian Polydamna, the wife of Thon; and the description the poet gives of this *φαρμακὸν Νεπενθὲς ἀχολόντε*, medicine for grief, pain, and anger, agreeing so well with the known qualities and effects of opium, for which Egypt was long famous, seems to make this conjecture not improbable; yet there are strong reasons against it; for, to pass what might be said of poetic exaggerations, of fables being inseparable from poetry, of the just, as well as extravagant encomiums on wine, &c. 1mo, Neither Theophrastus, nor any of the antients mention Homer's *nepenthes*, nor any of the antients

I know, took it for opium, or tell us what it was.  
 2do, One of Homer's οδυνηφάρμακα and  
 dyne medicines, he calls expressly βίζαν πικράτη  
 a bitter root, (Il. λ. v. 845.) Now the Heleni-  
 um not only takes its name from Helena, and  
 is called by the poets *bitter* emphatically, but  
 had also the virtues of the nepenthes ascribed  
 to it of old: *Helenium*, says Pliny, *ab Helenā,*  
*ut diximus, natum, favere creditur formae.---*  
*Attribuunt et hilaritatis effectum eidem potae in*  
*vino, eumque quem habuerit Nepenthes illud*  
*praedicatum ab Homero, quo tristitia omnis abo-*  
*leatur.* (l. 21. c. 21. l.) "*Nepenthes alii Buglof-*  
*sum, &c. sum alii esse tradunt. Versimilior*  
*est opinio posterior.*" Bod. in Theophr. p. 1118.

3tio, The Egyptian, Arabian, Persian and  
 Indian names of this juice are all evidently de-  
 rived from *Opion*, as *Osiun*, *Anfian*, *Osiun*, *A-*  
*fuun*, *Affion*, *Amfion*, &c. yea, as a great cri-  
 tic, (V. Clus. Exot. p. 244.) observes, *sare* pro-  
 nounced *Opion* by the Arabians. Bontius in-  
 deed derives the Greek name from the Ara-  
 bian \*; but he might as justly derive *theriaca*,  
 and *theriaca Andromachi*, from *theriaki* and  
*theriak Faruuk* of the Persians; and it does  
 not appear that the Arabians of old had so good  
 an opinion of opium as the eastern nations  
 have

\* "*Affion, ac quibusdam affusion. Bibibus et edis,*  
*opium Graccorum est; indeque magis, Iducor ut credam*  
*Graculos a vetustissimo populo vocatum, solum oriri, derivasse,*  
*cum ab omni memoria illi usi sit; Gracci vero tantum*  
*noxas hujus medicamenti, videntur novisse, usum vero ac*  
*virtutes ejus plane divinas non satis exploratas habuisse."*  
 Animad. in Garciae, c. 4.

have now<sup>t</sup>; or that they knew any thing more of it than the Greeks, from whom they derived and borrowed its latest name, as well as all their learning. Now wine being forbidden by Mahomet; the reason is plain why his followers, so soon as they became acquainted with opium, indulged themselves so much in the excessive use of it. Upon the whole, as I cannot affirm that helenium was the nepenthes, so, if it was opium, one would think some of the antient physicians, who were neither strangers to Egypt nor to Homer's works, would have made this discovery long before the sixteenth century.

As for the opium plant, *imo*, it is very evident, that on some account or other it was carefully cultivated long before Hippocrates lived; for Homer, (*Il. l. v. 306.*), in describing the death of Gorgythion, makes use of a very beautiful simile, taken from the *Μήκων ἐνὶ κήπῳ*, or garden poppy; and the *papaverum capita* in Tarquin the Proud's gardens are recorded by Titus Livius (*l. i. c. 53.*) and all the Roman historians; hence says Pliny, *Papaver fuisse in honore apud Romanos semper indicio est Tarquinius Superbus, qui legatis à filio missis, decutendo papavera in horto altissima, sanguinarium illud responsum, hæc facti ambage, reddidit, (l. i. c. 53.)*: Yea, the invention of it is attributed to Ceres, and so acceptable was it believed to be to that goddess, that she was named *Mecore*: That *Cere* was a common epithet of the papaver

† "Omnibus stupefacientibus fortius est opium." *Avi. l. i. fen. 4. c. 30.*

papaver among the poets; that it was offered to her in her sacred rites, and that she was presented holding it in her hand; so much honour could never have been done to a narcotic vegetable, especially by the Romans, had it not been otherwise very useful, and reckoned one of the frumenta which Ceres first taught the Greeks at Attica how to cultivate and use, for which she was deified after death. That the seed of the papaver was used in food by the antients, and particularly in desarts, will not be denied by any in the least acquainted with their writings: This D. Le Clerc acknowledges, but he thinks it was on some other account than for nourishment, or that the manner of dressing it divested it of the somniferous and noxious qualities (*Hist. de la Med.* p. 211.); but I must be of a contrary opinion, and think it nourishing, and not somniferous or noxious; for even in Hippocrates's works (*De Dieta*, l. 2.) it is called nourishing (*τροφιμὸν δὲ καὶ ισχυρὸν*); and, without depending on the testimony of the antients, poppy-seed is of a more delicious taste than sweet almonds; it is oily and farinaceous, and I have eaten large quantities of it frequently, of the black seed as well as of the white, and never found it somniferous or noxious: Besides, it is still used in food in some places, as well as the expressed oil, which is as innocent and wholesome as oil-olive. (V. Matthiol. p. 746. Geoffr. M. M. vol. 1. p. 713.) If this seed was noxious, bastards would not use it of its bad qualities, the narcotic part of poppies being very fixed, and not at all volatile; hence is confirmed what was said above, viz. that

that the anodyne and soporiferous virtues of the poppy is lodged in the milk, and in it only; in this it is not singular, for the proper juice in many plants differs much in nature from the common juices, *e. g.* the milk of the common garden lettuces is hypnotic, while all the plant besides is cooling, diluent, and nourishing.

It is also certain, *2do*, That our garden poppy is not specifically different from the *Μήκων* or papaver of the antients; for, although we could not make a tolerable botanical description of this plant out of all they have left us concerning it; yet we find in their works so many marks of it as are sufficient to distinguish it from all others; for instance, we learn from Theophrastus, (who mentions the *Μήκων* in six different places), that it is an herb, does not cast its leaves, contains a milky juice, has very small seeds contained in heads, from which the milky juice is collected: And from Dioscorides, that it is cultivated in gardens, has white seeds in oblong heads, or seed-bags called *κοδίσται*, with an asterisk on their top, whence by scarification is got the *ὀπὸς μέκωνος* or opium, which characters agree to no other plant. And, if we add to them what Dioscorides writes of the juice of poppies, and the fame of the mithridatium and theriaca in all ages, it will be evident beyond all contradiction, that our poppy is the papaver of the antients, and consequently, that their opium and ours is the same juice. This may appear to some a mere historical nicety; but, if the identity of the medicine

dicine be not first demonstrated, we cannot be benefited by the experience and observation of former ages. Happy had it been for physic, if the same nicety had been observed in every simple to which we give Greek or Latin names.

I have made *opium thebaicum* a shop-name of this juice, because the reputation it had of old, of being the best of the kind, made physicians commonly use it in prescription; and it still stands in some compositions in many authors. But in reality the Egyptian opium is not a bit better than the Natolian, if so good. *Opium thebaicum* therefore is the same with *opium elictum* or *optimum*.

I should conclude this section with a botanical description of the opium-plant or papaver; but, since it could be little else than a transcript of that in the *plantarum historia Oxoniensis*, added to the incomparable Carolus Linnæus his character of the genus, I pass it with this one remark, That though Morison describes the white poppy, as a species different from the *papaver hortense, nigro semine, sylvestre Dioscoridi, nigrum Plinio, C. B. Pin.* or the black poppy; yet the *papaver sativum*, I. B. includes not these two only, but seven more named in C. B. Pin. as different species, and consequently the first twenty-six species in Mr. Tournefort's *Institutiones*, these being only accidental variations of one and the same species.

### SECT. II.

Opium eases pain, promotes sleep, promotes perspiration, but checks all other evacuations, cheers.

clarifies the spirits, increassates the humours, and relaxes the fibres. Hence it is recommended in intense pains, watchings, spasms, spleen, vapours, fluxes, hæmorrhagies, tenesmus's; yea, in all the diseases proceeding from tension or irritation of the nerves, irregular motions of the spirits, or from thinness or acrimony of the fluids.

It would be too tedious here to recount the various opinions of authors concerning opium. Let it suffice to hint briefly at such afterwards as are contradicted by plain experiment. For I thought it necessary to examine it every manner of way I could think of, whereby the qualities of bodies, and their influence on us, are discoverable, in order to find out that particular change it makes on the fluids or solids, which I use to call the *primary*, or if you please, the most *mechanical* effect of a medicine; from which, and the mechanisim of our bodies, the secondary and more observable virtues or effects do proceed. This obliged me to make a variety of experiments, which I have as much as possible abridged in the following propositions or observations.

1mo, Opium is acrid, bitter, and strongly odoriferous. Dioscorides says it is bitter in taste, and carotic or soporiferous in smell; Matthioli, that it ulcerates the tongue and palate, if kept for some time in the mouth. Some call the smell *gravis*, others *gravis, teter, penetrans*, and so forth. If one attentively tastes opium, he will perceive, first, a nauseous and dissulative bitterness; then, in half a minute or so,

a pungent heat, affecting first and principally the tongue, then the palate, and last of all the lips, in a lower degree. The heat continues more than fifteen minutes, the bitterness still longer, provoking a plentiful discharge of the saliva. It heats and irritates also the nose, and creates an inclination to sneeze.

Hence, were we to judge of the virtues of opium, by its effects in the mouth or nose, or by its taste and smell, we would reckon it an acrid diaphoretic, nervine, and cathartic medicine. It certainly is diaphoretic, and properly enough may be called nervine, but not purgative, though by accident it sometimes has that effect. Eraustus thinks, that, if it were not for its *vis stupefaciens*, it would always prove cathartic. (V. Wedel Opiolog. l. 2. §. 1. c. 7.) According to him, therefore, the narcotic virtue has no dependence upon the above sensible qualities. This will appear the more probable, if we consider that some narcotics are acrid, others mild; some bitter, others sweet; some odoriferous, others not; some purge, others stop such evacuations, &c. and yet all of them are anodyne, and almost equally narcotic and virulent, if the dose be proportioned to their strength. And also that there are not a few cathartics as acrid, bitter, and strong-smelled as opium, which are no ways narcotic. Consequently we ought to distinguish between the stimulating and narcotic qualities of opium, at least we may conceive of the as different.

These sensible or stimulating qualities, in the opinion of some, recently confute the old notion of the refrigerating faculty of opium.

um, and prove it to be a very hot medicine, and certainly in one respect it is so. But it is as certain, that its effects in diminishing preternatural heat, observable in a variety of cases, also evince its cooling virtue; insomuch that, if the controversy was of any moment, it would not be difficult to prove that opium may more properly be said to cool than to heat.

2do, Opium consists of gum, rosin, and terrestrial parts, in such proportion, that in twelve parts of opium there are about five parts of gum, four of rosin, and three of terrestrial feculencies, neither dissolvable in watery or spiritous menstruums.

I dissolved opium in water, wine, vinegar, spirit of vinegar and brandy; and drew a tincture from it with spirit of wine, rectified with salt of tartar or alcohol, keeping always the proportion of one part of opium to twelve parts of the menstruum, and found that (a) alcohol dissolved four twelfths of opium, there remaining eight twelfths, of which water dissolved five twelfths, and left three twelfths of *foeces*. (b) Water dissolved eight twelfths; and of four twelfths remaining, alcohol dissolved one, leaving of earthy parts as above. It must be owned the proportions were not always exactly the same, but did not vary much. Hence water dissolves about three fourths of the sulphur of opium. I found also, (c) that water dissolves opium as well as wine, vinegar, spirit of vinegar; only the solution in water, in three or four days, becomes turbid, and soon after settling, separating from it a whitish substance, containing part of the dissolved

solved rosin. (d) That brandy, or proof spirits, dissolves both the gummy and resinous parts of opium, that is, all that water and alcohol separately can dissolve, and that even without heat, leaving nothing but the fœculet part. Hence there being in twelve parts of brandy, about eight parts of water, so much water, wine, or vinegar is a sufficient menstruum for one part of opium. But, though I tried this proportion of eight to one, and it answered; yet, because twelve to one completed the solution sooner, I kept by it. For (e) water, wine, vinegar, and brandy, in the proportion of twelve to one, took but four or five days for the solution without heat, if frequently shaken; but water in the proportion of eight to one took ten or twelve days. Alcohol requires about a month. And (z) the residuum of a solution of opium in cold water contains nothing which boiling water can extract. Supposing therefore that the rosin or sulphur of opium is as good or as much wanted as the gum, or the mucilaginous part, brandy is certainly the best menstruum.

3tio, The gum of opium has the same taste and smell with the juice; but the rosin has no taste, and smells rather musty than of opium, so far as my senses informed me. This is taken notice of also in the Col. Chym. Leid c. 310. where the remainder of the solution of opium in water is called, *Massa tenax*, *omnis ferè odoris et saporis*; *quæ postea in spiritu vini tingitur*; *nam nullius ferè usus, nisi in eadem restantes interne magnæ* *anxietates* *circa*

*circa præcordia efficere solent, sine ullo doloris levamine.* But of the extract with water, and mixed with some aromatics, the author says, *Est anodynum optimum, quod nunquam anxietates circa præcordia, neque obstructions uteri, neque phantasias conciliat.* This rosin is very much condemned by Dr Jones, &c. and charged with all the ill effects of opium. I wish they had given more convincing evidence of the mischiefs it does. The world is too cautious now to believe implicitly every general assertion.

It is well known that the solution of opium in water is anodyne and soporiferous. has all the good qualities of the juice, and operates in as small a dose; and yet that opium in substance is sometimes preferable to it; that allowing the half of the sulphur of opium only to be rosin, even thus, one half of it is in all the aqueous solutions and extracts; and that a few grains of the most tenacious, tough, and sticking rosin, cannot do much prejudice, if not otherwise hurtful, far less the third or fourth of a grain. Common aloes is fully as resinous as opium, and its rosin as sticking. This rosin of aloes has generally been blamed for causing the *tenesmus hæmorrhoidalis*, &c. by its irritating acrimony. But a late member of the royal academy, (who asserted also rhubarb was not astringent) has attempted to prove it not only innocuous, but very friendly to nature, and the best corrector of the acrimony of the guts. Let it this should be the case with opium, I made experiment upon myself with a tincture of the resin of opium dissolved in water, extracted by alcohol. I took at first

ten.

ten drops, then fifteen, and last of all twenty-five; and must own that it tasted strongly of opium, and was somniferous; but I was not sensible of any bad effects of it. I might add, That the *balsamum anodynum* is found to be really anodyne internally as well as externally, though the tincture is extracted with rectified spirit. But, whatever is in this, crude opium may be preferable to the solution, as it does not so soon dissolve in the stomach, or as it increases the diaphoretic quality, or on account of some singularity in the constitution. But for the most part what does not dissolve in water may be wanted. Hence I infer, that the narcotic virtue of opium does not depend on its *vaporosum sulphur*\*, nor on its *sulphur crassum admodum rarescibile*, a-kin to that of crocus, castor, &c. †. Few vegetable substances have less sulphur than crocus ‡. It yields all to water, nothing to oil. And I might

\* Fred Hoffmannus de opiat. p. 151.

† Geoffr. M. M. tom. 2. p. 693. and 701. "Sulphur crassum quod in opio deprehenditur admodum rarescibile est, ut liquet ex opii distillationibus, vehementi odore opii resperlis; et ab hoc sulphure condensato, et summæ raritatis capaci ejus virtutem pendere existimo. (Geoffr. p. 693.) Quæret aliquis, quænam sint principia quibus opium hanc insignem sanguinis distillationem, et expansionem excitare valeat? Cui respondeo, opium salibus tum acido, tum alcali urinoso, et sulphure crasso plurimum condensato, sed summæ divisibilitatis, tum expansionis capaci componi. At vix non tantum a sulphure, ejus vim somniferam pendere potest, quam a croco, quod quidem observamus corpora a sulphure, ut sunt Crocus, Nux moschata, &c. in soporem inducere." Id. p. 701.

‡ Oleum essentielle croci nulli extitisse legimus, Zwell. Ph. Reg. 704. Crocus analysi chymicâ examinatum, Geffroy M. M. tom. 2. p. 284.

might add, That castor and aromatics are commonly reckoned correctors of opium.

4to, Though opium is rather alcallescent than acescent, yet it cannot be called an alkali. This I learned by many experiments: For (a) I dropt into a solution of opium in water, in different glasses and separately, *spiritus aceti*, *cornu cervi*, *vitrioli et oleum tartari per deliquium*. None of them caused the smallest ebullition or effervescence; the acids only diluted the solution; but the alkali turned it milky, the mixture soon separating into two parts; below it was clear and transparent as before, and the milky part gathered above, like a thick cream, which, on shaking the glass, subsided, leaving the upper part clear; yet this did not always happen; for, on repeated concussions of the glass, the cream sometimes returned to the upper part of the solution. The solution with the oil of tartar in it smelled somewhat urinous. The cream separated by filtration, and dried, melted, and flamed with heat, and dissolved in alcohol, but not in water; and consequently was part of the sulphur of opium, which the water had dissolved. To be more certain of this, I dropt *oleum tartari*, and *spiritus cornu cervi*, into separate portions of a solution in water of the residuum, after extracting the rosin of opium with alcohol; and found that neither the volatile nor fixed alkali caused the least separation, or precipitation, but only diluted the mixture, alcohol having dissolved and extracted all this sulphur.

(3) I mixed the solution of opium in water with an infusion of violets; it did not turn red,

red, or undergo any change, except what necessarily follows the conjoining of two colours so different, when the one does not destroy the other. Tincture of saffron in water had the same effect. I infused in the said solution a piece of blue paper, with which sugar loaves are commonly covered, and poured some of it upon another piece of the same paper, till both were thoroughly wetted with the solution; and though at first, when it was covered with the red solution, the paper appeared redder than before; yet, when dried, it was so far from being redder, that it had lost its native reddish cast, and was become of a worn-out, or faded blue, rather greenish than reddish. I mixed also the solution of opium with the tincture of turnsole in water, and it turned of a bright red colour. The aqueous tincture of saffron made the same change. The tincture of turnsole, betwixt the eye and the light, is of a deep crimson, but, when it dries on the glass, is blue like the juice. What dried on the glass of that mixed with opium continued a bright red. This must be owing to somewhat else than the colour of the solution, since the water distilled from opium has the same effect, (as is noticed below), and consequently to the acid in opium; and thus only we discover any acid in it; which cannot be very strong, since not only sal ammoniac, but even borax, madden the turnsole; and this same solution of opium turned a solution of corrosive sublimate milky, and curdled it; spirit of vitriol made it again clear. In a word, this solution of opium gave more

more phenomena of an alkali than of an acid †.

(γ) These experiments (α) and (β) were made also with the opium I collected here, and likewise with the solutions of common opium in wine, vinegar, spirits, &c. with the same event, except in so far as the menstruum made a difference, *e. g.* *spir. vitrioli* precipitated the spirituous tinctures; *oleum tartarii p. d.* would not mix and incorporate with them, though often well shaken together, &c.

(δ) I poured a few drops of the *ol. tartari p. d.* on crude opium, but could observe nothing like an ebullition or effervescence, which some have asserted. It became indeed a little whitish when dried, and smelled somewhat urinous, by reason of the alkali's action on the sulphur and essential salt. The occasion of this experiment, which might otherwise seem superfluous, was because prof. Hoffman attributes this change of colour and smell to the congress of the alkali with the acid sulphur. Though he denies that the blood can be coagulated, or that the animal spirits can be fixed by it. *Opiat. p. 143. and 146.*

(ε) Blue vitriol turned a solution of opium in water, whitish and opaque, or milky; but this subsiding, the upper part was transparent, and of a beautiful green colour. Green and white vitriols made it black like a dirty ink.

wine, . . .

L

To

By

† "Quod, acidum in opio reperiatur, et quidem potens, probatur tum per analysin: tum etiam si solutio opii in Heliotropii tincturam affundatur; colorem enim rubrum igneum hinc tinctura conciliat." Geff. M. M. tom. c. p. 592.

To see whether this was owing to the heterogeneous substances with which the opium was covered with, I drew a tincture from them separately, and mixed it with a solution of green vitriol; but it did not in the least make it black.

From these mixtures I may infer, *1mo*, That the essential salt of opium is ammoniacal. *2do*, That opium contains a very small proportion of an acid. And, *3tio*, That it is somewhat astringent, or makes the same change on chalybeats that vegetable astringents do.

*4to*, The most active principles of opium are not volatile as the chymists speak, but very fixed. For (a) it keeps well. I have of it forty years old, which is still hard, solid, and retains its taste. (b) I kept *opii drach. i.* in the heat of boiling water for five hours; and though fresh and pretty soft, it scarcely lost one grain and an half in weight. (c) I had opium dissolved in water, fermented and distilled in the laboratory, but got no proof spirits from it, tho' *opii unc. viii.* were used. The first four ounces of spirit that came over were hot to the taste, and had a peculiar smell and flavour, very different from that of opium, and not bitter; the second four ounces were much weaker, and the last four almost tasteless. The first and second spirits, or waters rather, were mixed and rectified by distillation and I got from them about three ounces, which might have been a proof spirit; but on trial, it appeared weaker than the first four ounces, and was not inflammable. When, having filtrated what remained after the first distillation, I dried the resinous residuum, and had as much fully

fully as if no fermentation had preceded. The filtrated liquor I evaporated to an extract; but, before it was cold, the vessel in which it was being broken by accident, I lost part of it; but, so far as I could guess, I would have had a quantity of extract and residuum, very near equal to the quantity of opium I employed. The extract had nothing of the smell of opium, but the residuum still retains a little of it, though it is near five years since the experiment was made.

Hence, 1<sup>mo</sup>, Old opium is little worse or weaker than new; nor can it be called better because weaker, since weakening a medicine is the wrong way to improve it. 2<sup>do</sup>, Toasting opium on a plate of iron with design to correct it by divesting it of its narcotic part, which was long practised, and much commended by authors, may burn it, but cannot make it better: *Mirum est*, (says Wedelius, opior. p. 54.) *quod authores nonnulli liberari opium contendunt à sulphure suo narcotico, cum tamen illam ipsam intendunt, quærantque et expectent virtutem ex opio. Non castrandum est opium virtute narcotica, non sulphur narcoticum separandum, aliàs evanidum fiet, et nullarum virtutum; sed heterogenea sunt semper vendenda.* 3<sup>tio</sup>, Opium affords little or nothing by distillation; would we therefore have the virtues of the tincture in a liquid form, we must infuse it in wine, or rather brandy.

4<sup>to</sup>. By a chemical analysis, phlegm, urinous spirit, oil, volatile as well as fixed salt, and earth, may be got from opium. Although it must be acknowledged that some simples,

as different in figure, nature, and qualities, as possibly can be, afford the very same principles by a chemical distillation, *e. g.* deadly nightshade and cabbage†; and consequently that very little of the virtues of opium can be thus either investigated or explained: Yet seeing some by the analysis pretend to prove that the effects of opium depend on its sulphur, others on its volatile salt, others that its sulphur is narcotic, and salt diaphoretic, &c. ‡. I thought it not amiss to repeat this process three times, having the use of the laboratory and Dr Plummer's friendly assistance; and we found that sixteen ounces of opium distilled by itself in a glass-retort, with a sand heat gradually increased, gave

(*α*) Of phlegm an ounce and drachm ii. This phlegm was very foetid and empyreumatic, like that from mustard-seed; it effervesced or bubbled neither with spirit of vitriol nor with oil of tartar, nor did it change the colour of syrup of violets, but turned the tincture of turnsol into a pretty bright red, which oil of tartar again changed into blue; it also whitened and precipitated a solution of corrosive sublimate.

(*β*) Of spirit and oil, unc. vi. drachm ii. that is, *spiritus unc.* iv. drachm ii. and *olei unc.* ii. The spirit was very foetid and acrid, and made a great ebullition with spirit of vitriol, the oil black and light, partly thin, and partly thick.

(*γ*)

† V. Homberg. in Acad. R. 1701.

‡ V. Wedel. Opiol. l. i. c. 9. Pitcairni Diss. de cicul. sang. 4. p. 13. Geoffroy M. M. 2. 692.

(c) Of volatile salt, adhering to the neck of the retort, about gr. iv.

(d) Of *caput mortuum unc.* vi. So we lost in the operation about unc. ii. drach. iii. gr. lvi.

The best method I could devise to find how much volatile salt was contained in this spirit (no author having so much as guessed at it) was to compare its strength with the strength of *sal. C. C.* in enervating the spirit of vitriol, and finding that one part of *sal. C. C.* dissolved in water, saturated as much spirit of vitriol as eighteen parts of spirit of opium, I thought I might conclude that in *spiritus opii drachm. xxxiv.* there was not more than 114 grains of volatile salt, which, with the four grains in the retort, made drachm i. gr. lviii. that is, all the volatile salt, we could obtain from *opii unc. xvi.* and consequently one grain of volatile salt from sixty-six grains of opium. Hence and from N<sup>o</sup>. 4. and 5. it appears that the virtues of opium do not depend on its volatile salt or spirit, far less on its spirituous and volatile parts, coagulating the blood as *sp. urine* does *sp. vini*, which was Cranius's opinion. V. Hoffman, *Diff. de opiat.* 143.

The *caput mortuum*, by long and repeated calcinations in a crucible, was reduced to drachm iv. gr. xlix. I made a lixivium of it with boiling water, filtrated it, and dried the earth, which weighed drachm ii. gr. li. so water extracted drachm i. gr. lviii. This lixivie tasted salt, did not effervesce with spirit of vitriol, nor with oil of tartar *p. d.* neither made any change on syrup of violets, tincture of turnsol, or solution of corrosive sublimate.

sublimate. I evaporated it over the fire to a pellicle, and to dryness in a delft-plate in the air, and had of a pretty white salt in powder, with numerous small prismatic crystals in it, drachm i. gr. xiii. still neither alcali nor acid by any experiment. The earth I again calcined for three hours, by which it lost about gr. vi. in weight, and being elixivate and dried, it was diminished gr. xx. more, but the remainder of the lixivium, evaporated to dryness, gave only about ten grains of a salt like the former, though not at all alkaline, but whiter, so of the calcined *caput mortuum* water extracted drachm ii. gr. xviii. which, with the gr. vi. lost in the last calcination, subtracted from drachm iv. gr. xlix. gives drachm ii. gr. xxv. as the quantity of earth contained in a pound of opium. The quantity of the salt is not equal to the substance dissolved in the water, because part of the lixivium was employed otherwise.

The proportions of salt and earth were much the same in the *caput mortuum* of all the three analyses, and also in the ashes of some opium I calcined by itself, none of them affording any fixed alcali; but having by me a little of the fixed salt of the second analysis, which was made about five years ago, by evaporating the lixivium in a tea cup in a chamber window, and was in small, somewhat prismatic, but irregular and yellowish crystals; I dissolved it in water, filtrated and crystallized it without heat as formerly, and had a salt like brown sugar-candy, which is a true fixed alcali by every experiment. During the five years

years it had lost about an eighth part of its weight, and the paper was moist in which I kept it; it does not melt or run *p. d.* but is still perfectly dry; to account for this it requires more experiments.

In the first analysis we increased the fire slowly, and changed the recipient so soon as all the phlegm was come over; in the second we did not change the recipient, but raised the heat to the greatest degree the retort could bear, as fast as we could, and continued it for ten hours; in the third we first kept the retort in *balneo mariae*, or boiling water, for the greater part of a day, and then changed the recipient, and gave it the sand heat. Thus we had two drachms less of water than in the first analysis; neither of them effervesced with acids or alcalies, but the water in this third process, which was almost tasteless, smelled more of opium, and was less empyreumatic, precipitated a solution of corrosive sublimate, and diluted only syrup of violets, but redened, as did the solution above, the tincture of turnsol. Hence opium contains but little acid, or a very weak acid, though Mr Geoffroy found in it a *sal acidus et quidem potens*.

A pound of opium, by a chemical analysis, ga according to Dr Pitcairn, *spiritus drach. xlv. olei drachm. x. β. capitis mortui drachm. lxix.* and there was lost in the distillation *drachm. x. β.* according to Mr Geoffroy, *spiritus drachm. xlix. olei drachm. ix. β. cap. mort. drachm. lxix.* Lost *drach. vii ℥.* and the *cap. mort.* calcined to *drachm. viii. gr. xxv.* yielded

yielded *salis fixi mere alcali* drachm. ii. gr. xxviii. ℥. consequently there remained of earth drachm. vi. gr. vi. ℥. but by our processes *phlegmatis* drachm. xlii. gr. vi. *salis volatilis* drachm. i. gr. lviii. *olei* drachm. xvi. *salis fixi* drachm. ii. gr. xviii. *terra* drachm. ii. gr. xxv. and there evaporated in the distillation, perhaps of air, drachm. xix. gr. lvi. and consumed in calcination of oil, &c. drachm. xlii. gr. xvii.

7mo, The effects of opium on other animals are not much different from its effects on men, or it is, to some of them at least, innocent, hurtful, or poison, according to the dose.

(a) In the physic garden at Holyroodhouse, (where all the experiments on frogs were made) I one evening put a strong big paddock into a pot of water, wherein a small quantity of opium was dissolved; it soon appeared to be uneasy, by making strong efforts to get out of it, but in a short time it flag'd or grew dull, making very little motion, and next morning it was dead and much swelled.

(c) In presence of, and assisted by Mr Robert Fullarton, a curious gentleman, and very dextrous in microscopical observations, (in August 1733), I conveyed through a small glass tube a few drops of a solution of opium in water into a frog's stomach, and putting the animal into a glass cylinder, adapted it to a good microscope, that we had a distinct view of a part of the membrane betwixt the toes of its hinder foot, where the circulation of the blood may easily be seen. My design was, since I found opium killed frogs, to observe if there

there was any visible change made by it in the blood itself, or in its motion; neither of us could indeed see any alteration of the blood as to its consistence, colour of the serum, magnitude, figure, or colour of the red globules; but we very distinctly saw a surprising diminution of the blood's velocity, for it did not move half so swiftly as it uses to do in these creatures. We alternately looked at it again and again, and in less than half an hour saw the velocity of the blood gradually increase, the uneasy frog recover its wonted vigour, and the blood its common celerity; upon which we took out the paddock, put it in a basin of clean water, and allowed it half an hour to refresh itself, then gave it another dose of opium, fixed it to the microscope with all expedition, and viewed it as before; the blood then moved yet slower than it did the first time, and, its velocity gradually decreasing, at length it stagnated, first in the smaller then in the larger vessels, and, in about a quarter of an hour, the animal expired. One thing was very observable all along, viz. That, notwithstanding the diminished velocity of the blood, there was no sensible diminution of the frequency of the pulse; yea, when there was no circulation or progressive motion of the blood in this part, the pulse was visible by an undulating motion; that is, the blood returned as far back at every diastole of the heart as it was protruded by the preceeding systole; this continued till the frog was quite dead, or at least appeared to be so. When we had lost all hope of its recovery, I opened it, and found nothing

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in its stomach but a clear mucus like a gelly, a little coloured with the opium, of which it was full; every thing else seemed perfectly natural. This experiment we frequently repeated, and it had always the same appearances and event. The recovery, however, of one of the frogs, which, for a considerable time seemed to be dead, is not to be omitted. My friend and I one evening killed, as above, a couple of frogs with opium; one of them, which was the strongest, I laid half in water on a tile, in the bottom of a water-pot, that if it recovered it might sit either wet or dry as it liked best; the other I left on the earth dry under a hedge. Next morning, when I returned to the garden, I found the one under the hedge dead as I left it, but the other in the water-pot was alive, and appeared to be in perfect health.

While we were thus employed, another thing occurred, which, though foreign to the present subject, it may not be amiss to mention. One of the frogs we got for the above experiments, had not the use of one of its hinder legs, which was of a pale reddish colour. This made me desirous to observe by the microscope the circumstances of the circulation in this paralytic, and apparently inflamed member; and we found that the red globules were entirely dissolved; that the blood-vessels were distended with a reddish homogeneous liquid, as if the part had been injected with a bloody water; and that neither sense or motion remained in it.

(γ) My colleague Mr Monro was so good as,  
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at my desire, to inject into the crural vein of an old dog, of forty-two pound weight or thereby, half an ounce of opium, dissolved in four ounces of water filtrated, and of the same warmth or heat with the blood of the animal; and at three different times: The first time he threw in about drachm xv. and very slowly. It had no observable effect. About an hour after, he injected, also slowly, drachm viii. more, and immediately the dog was seized with strong convulsions, the pulse was frequent and small; and after some time he foamed at the mouth. But there appearing no signs of immediate death, after we had waited an hour more, he threw in as quickly as he could the last drachm ix. upon which the pulse became full and slow; and, in a minute or so, the dog expired. Opening his thorax, we found the lungs sound, but very small and white, without any blood in them; the heart very big, and all its great vessels much distended with blood. In this state they continued till next day, when, on opening them, clotted blood ran out from the right ventricle, and *venæ cavæ*; the blood in the left ventricle and aorta being much more coagulated. But we could observe nothing in the brain or abdomen preternatural. I mentioned the filtration and heat of the solution, and slowness of the injection, because some days before, two young gentlemen students had made the same experiment with a solution neither filtrated nor warmed, which they pushed in very forcibly; upon which the dog fell immediately

ly into violent convulsions, and died in three minutes. V. Dr Freind. Emmenolog. cap. 14.

(d) We gave also to a little dog of about fifteen pound weight (as we guessed, for by an oversight of a servant he was not weighed) at different times, but all in the space of a few minutes, and wrapt up in the crum of new bread, *opii drach. ii.* Being very hungry, he swallowed it greedily, without shewing any inclination to vomit. We watched him about an hour, but observing no alteration, or effect of the opium, and it being late, we left him in safe custody. Next morning he was not sleeping, but had lost the power of his limbs, and would neither eat nor drink. In this state he continued four days more, without tasting any thing, and then perfectly recovered. The same quantity of opium dissolved in boiling water, had more sudden and more fatal effects on the dog mentioned by Dr Mead, in his elegant essay of opium.

8vo, Opium externally applied, is discutient, anodyne, and soporiferous; yea, has almost the same effects as when taken inwardly. One of the inconveniences following the immoderate application of opium, mandragora, and hyoscyamus, for pains of the eyes, taken notice of by Galen (Method. med. 1. 3. c. 2.) is the mydriasis, or a preternatural dilatation of the pupilla. And Mr Ray was witness to a notable instance of this kind. A woman having applied part of a leaf of the *solanum lethale* Park. or deadly nightshade, to a cancerous ulcer a little below her eye; in one night's time the uvea lost entirely its muscular

lar force, and was so relaxed, that the pupilla, in the clearest light, remained four times bigger than that of the other eye: But, on removing the leaf, the *tunica uvea* recovered its tone by degrees. *Et ne quis* (says he) *casui imputet, tribus distinctis vicibus, in se ipsa experta est, me quoque tunc temporis fortè fortunâ presente et spectante; chirurgus qui cancrum eradicaverat, et ulcus sanaverat, folii particulam loco imposuit ad humores repellendos; verùm ob symptoma prædictum eandem remove coactus fuit; R. H. p. 680.* That opium gives ease in pains of the teeth and ears, in cholics, inflammations, yea in cancerous ulcers, externally applied, is well known; but that it stupifies the part to which it is applied, so as to make it insensible of any pain, without the intervention of sleep, is not so evident. *Nos nunquam stuporem partis* (says Wedelius, opiolog. l. 2. § 3. c. 1.) *ab impositione opiatorum observare potuimus.* I applied it by way of plaister round my little finger, also to my arm immediately above the internal condyle, for a whole night; it grew soft, and stuck fast to those parts, but neither stupified nor inflamed them, nor had any effect that I could observe. I have also several times applied a solution of opium in water to parts excoriated, and superficial wounds, and found it always hot and irritating like weak spirits, the pain continuing for some minutes.

Hence, 1. Opium is not, properly speaking, narcotic externally; and there may be pains which it cannot remove as a topic. Platerus found it ineffectual even in the gout, (Prax. l. 1. c. 5. p. 159.) Is therefore the common  
VOL. V. M caustic

caustic prepared with opium gives no pain when used, it is a pretty extraordinary phenomenon. I never tried it, not because I feared a gangrene, but because the fact is improbable †. 2. That narcotics, at least sometimes, impair the tone of the muscles, yea cause for a time a *resolutio nervorum*, or palsy, about the place to which they are applied externally.

¶ *gno*, Opium rather coagulates or thickens, than dissolves or attenuates the blood. I mixed a solution of opium in water, with milk, serum of the blood, and blood itself, drawn fresh from arteries as well as veins. It made no observable change on milk, yet, after the mixture stood some days, there was a separation; a white grumous part subsided, it had a cream above, and between these it was clear, and of the colour of the solution. It turned the *serum sanguinis* more thick and whitish, and curdled it a little; it also had the same effect on the blood itself fresh drawn, which always precipitated a sort of whitish coagulum; and so left what was uppermost rather, though not much, thinner. Sydenham's laudanum made the blood from a vein appear more crimson-coloured, but next day it was darker; there was a greyish precipitation, and the upper part was not coagulated as usual, perhaps because shaken and diluted by an uncoagulable liquid. These trials agree, tho' not perfectly, with Dr Friend's experiments, (*Emmen. c.* 14.), yea, and seem to favour in some measure what is affirmed for fact

† See Hildesheimius, as cited by Wedelius, *opialog.* l. 2. sect. 3. c. 1. 2.

fact in some authors, to wit, that the blood has been found congealed and frozen, as they express it, about the heart of such as have been killed by opium. (See *Wedelii opiol.* l. 1. § 1. c. 5.) There was a grumous blood in the upper part of the brain of the dog, which Dr Mead mentions; Mech. account pois. p. 152.

*Idem*, Habit, or customary use, makes that quantity of opium safe, yea beneficial, which would otherwise be poison. A few grains of opium are death to any person in health, and unaccustomed to it; but if one, beginning with small doses, habituate himself to it by degrees, he will not only in time be able to bear a much greater quantity, but also at length find it as necessary as wine or spirits are to tipplers ‡: I said in health, because some diseases, *e. g.* madness, in a great measure enervate the force of this medicine: But that a much smaller quantity than some take every day may prove mortal, cannot be doubted; and we had here a melancholy instance of it not long ago. A woman about forty years of age, big and corpulent, was one day liberally blooded, and ordered a purgative bolus next morning; instead of the purgative, a servant, by mistake, gave her part of a liniment she commonly applied for the hæmorrhoids. The liniment was originally composed of *myrrhæ drach. ii. opii drach. i. ol. ros. coct. unc. sem.* She had made use of two thirds or more of it for the piles, and took the remainder about seven in

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the morning. The fatal mistake being discovered, her physician ordered a vomit; but, tho' it was no more than three quarters of an hour after she had got the liniment, the muscles were so paralytic that she could swallow nothing. In a word, nothing that was done succeeded. Her pulse, which was large, equal, and not very frequent, about half an hour after eight, sunk, and began to intermit, and a quarter of an hour before nine she died, without any convulsions. Her physician told me, that, when he first saw her, her face was very pale, she could not speak, and appeared like one mortally drunk. On the other hand, among the eastern nations, a drachm of opium is but a moderate dose; Garcias knew one who every day took drach. x. and more. *Et licet, says he, stupidus et dormitabundus semper videretur, aptissime tamen et docte de omnibus disputabat. Tantum potest consuetudo; l. c.* And it is very remarkable, that, notwithstanding this excessive use of opium, the Turks are generally long-lived ‡.

¶ *imo*, The action of opium is very analogous to that of wine, or vinous spirits, excepting only in so far as it depends on the quantity requisite for the same effect. For, *imo*, wine is the best remedy for the inconveniencies following the disuse of opium. Acosta gives a memorable instance of this: "There were, (says he), some Turkish, Persian, and Arabian captives aboard the ship in which I returned from

‡ Vide Bellon. l. 3. obs. 14. et 15.

“ from the Indies to Portugal, who had a small  
 “ quantity of opium concealed, and used it on-  
 “ ly as a medicine. When they had consu-  
 “ med it all, one of them, a Turk of Aden, said  
 “ to me, Since you have here the care of the  
 “ sick, I must let you know, that, unless you  
 “ give me and my companions opium, we  
 “ cannot outlive two days. I denied I had  
 “ any. The only remedy then, said the Turk,  
 “ whereby we, who have been accustomed to  
 “ eat opium, can be recovered, is, to give each  
 “ of us a draught of pure wine every morn-  
 “ ing. Tho’ this is very hard and uneasy to  
 “ us, being contrary to our law; yet, since  
 “ our health depends on it, we must of ne-  
 “ cessity bear it. By his advice I gave them  
 “ all wine; they recovered, and in a month’s  
 “ time would taste no more wine, and nei-  
 “ ther needed nor desired opium.” Prosper  
 Alpinus also observed among the Egyptians, that  
 those who did eat opium constantly, if they  
 wanted it but one day, became very uneasy  
 at the time they used to take it †. 2do,  
 Both the good and ill effects of opium are ve-  
 ry little different from the good and ill effects  
 of wine: It would be too long to enumerate  
 these here. Wedelius may be consulted on this  
 head, and Mr Geoffroy, in his M. M. who has  
 M 3 abridged

† “ Animi siquidem deliquio fastidiosissimo ipsi tentan-  
 “ tur, nulloque auxilio sic tutò liberantur, quam rursus opium  
 “ devorantes; and adds, Multos ab hac servitute liberatos vi-  
 “ di, si i. hora, quâ soliti sunt ipsum capere, largius ex vino  
 “ Cretico pipere, atque aliis aromatibus, alterato, potent;”  
 Med. Eccl. l. 4. c. 1.

abridged and somewhat amended Dr Jones without naming him. I shall only observe, that *vinum*, to use Angelus Sala's words, *secundum omnes authores, imò ipsam experientiam, abusu phrenesin, maniam, rabiem, furorem, stupiditatem, lethargiam, paralyisin, aliosque detestandos affectus, temporis successione parit, non minus quàm opium*. Opiolog. c. 3. p. 531. And that vinous spirits are so anodyne externally as to remove in an instant the pain even of burnings, if the cuticle be not separated. And, 3tio, vinegar is as much an antidote to opium as it is to wine; no wonder then that Platerus (*Quaest. Therap.* 88. and 80.) should affirm wine to be a real narcotic, and Sydenham, that opium is the most excellent cordial in nature, (*Sect.* 4. c. 3.). Hence wine cannot be said to correct opium, nor can opium be said to act by rarefying the blood, since spirits, which coagulate it, produce much the same effects.

12mo, The virtues of opium, internally taken, depend chiefly on its action or influence on the stomach. I have often observed a violent tenesmus removed in a moment by a few drops of liquid laudanum, vomiting stopt, pain eased, yea and sleep procured the same way, and almost as soon. There are many instances in Wepfer (*De cicuta aquatica*) of very terrible symptoms, and death itself, caused by narcotics before they went out of the stomach, and without so much as inflaming it, or undergoing any visible change in it, far less vitiating the mass of blood; and also of the same symptoms being removed, and death prevented by vomiting.

miting. A glass of simple spearmint water new drawn, threw a strong man into epileptic fits, and almost cost his life. Hyssop water had the same effect on a woman not many years since ; some have died of surfeits while eating ; and excess would kill many more than it does, if the stomach did not disburden itself.

Several other praecognita might be here insisted on, as, That, *1mo*, in pain there is a preternatural contraction of the sensible fibres, and in sleep a relaxation, or, as it were, palsy of the organs of sensation and voluntary motion. *2do*, The most inconsiderable or minute mechanical impulse on the nerves, or unusual impression on the mind, may be the cause of the greatest changes in the animal oeconomy. *3tio*, The virtues of many medicines depend solely on their action on the nerves or nervous fibres. *4to*, The same force or impression on the nerves of one part, has very different effects from what it has on the nerves of another ; yea, often at one time, from what it has at another time, on the same part, *e. g. asarum* in the nose and in the stomach, tobacco at first, and after it is habitually used. *5to*, This action on the nerves being, many times, no otherwise discoverable than by its consequences, the primary and secondary effects of medicines may be, and are too often confounded. And, *6to*, As the primary effects of a medicine have frequently several secondary ones, so the same simple sometimes differently affects the same nerve, or at least different nerves of the same part, so as to produce effects altogether

ther independent of one another ; this our taste in many instances can discover, and the taste of opium, compared with that of other narcotics, sufficiently evince it to be the case here ; that is, that the stimulating qualities of opium have very different effects from the narcotic part ; and if we compare the effects of wholesome aromatics with those of the most virulent narcotics, we may add, 7<sup>mo</sup>, That the stimulating or aromatic part of opium is so intimately united to the narcotic as thereby to mitigate it in some measure, and render it more friendly to nature than the narcotics that want it are, such as the *hyoscyamus major vel niger*, C. B. Pin. or henbane, *fium erucæ folio*, C. B. Pin. or Gefner's water hemlock, and many others ; while both stimulating and narcotic parts contribute notably to the hypnotic and other qualities of this famous medicine. These, I say, and the like truths, might be further insisted on ; but, lest I be too long, I shall suppose them elsewhere sufficiently explained, and conclude this section with a few inferences from the whole. I infer therefore,

1<sup>mo</sup>, That the anodyne and hypnotic virtues of opium do not depend on its action on the brain or on the blood, whether externally or internally used.

2<sup>do</sup>, That it affects first and principally the nerves to which it is applied ; next, such as are more immediately connected or communicate with them ; then those which serve for sensation and voluntary motion ; and last of all, by consent, the whole nervous system.

3<sup>tio</sup>, That this impression, action, or influence on the nerves differently affects the  
senses.

*sensorium commune* and the mind, according to its degree and the nature and function of the nerves primarily acted upon.

“Those who take a moderate dose of opium, especially if not long accustomed to it, are so transported with the pleasing sense it induces, that they are, as they often express themselves, in heaven; and though they do not always sleep, yet they enjoy so perfect an indolence and quiet, that no happiness in the world can surpass the charms of this agreeable extasy;” Mead. of op. p. 146. Which therefore, *ceteris paribus*, must remarkably promote a free circulation and perspiration, and, by removing impediments, dispose to sleep; for *pericharia corpora efficit leviora. Lætitia diastolæ et systolæ efficit faciliores, moestitia difficiliores. Nihil magis reddit liberam perspirationem, quàm animi consolatio. Lætitia moderata insensibiliter evacuat solum superfluum, immoderata superfluum et utile*, are known aphorisms of Sanctorius. But, if the dose be immoderate or excessive, and the impression exceeds the bounds prescribed by nature, as in drunkenness, these transports of joy degenerate into ridiculous mirth, deliriousness, &c. or end in profound sleep, lethargy, &c. or a palsy, apoplexy, or sudden death, finish the tragedy according to circumstances; whereas the effects of opium in the mouth and nose, on parts sore or excoriated, &c. are very different, as has been formerly observed. The anodyne virtue of opium externally applied therefore cannot be the effect of any delightful sensation in the part: Pleasure may well be

be the consequence, but it does not appear to be the cause of the removal of pain.

4<sup>to</sup>, That the primary or first observable effect of the mechanical impression or action of the narcotic part of opium on the nerves, is the relaxation of their fibres.

Whether this relaxation is the physical action of opium on the nerves themselves, or only the effect of the impression thereby made on the *sensorium commune*; that is, whether opium is immediately or only mediately the cause of it, I shall not positively determine. It may perhaps be as difficultly explained how the action of narcotics on the nerves causes a paralytic relaxation, as how the images painted on the retina cause vision; there is a *non plus ultra* in all physical inquiries.

Neither can I say, that the stimulating or aromatic part of opium does not contribute to its easing pains; for spirit of wine is anodyne, but it causes no relaxation of the part, or near it, to which it is applied; in which it evidently differs from narcotics.

Now, as this relaxation of the nerves, and consequently of the moving fibres, demonstrates opium to be more than a palliative remedy in a great many diseases; so it is not difficult by it to account for its bad as well as good effects; for, by relaxing to certain degrees, it may prove anodyne, cordial, diaphoretic, hypnotic, &c. or cause stagnations, deliriums, lethargies, apoplexies, death.

I have hitherto on purpose taken little notice of opium's rarefying the blood, though asserted by authors whom I very much esteem, not only

ly because, by the foregoing experiments and observations, it appears to have no such effect, at least, that the action or operation of opium cannot depend on it; but also because, were this theory admitted, it might be of bad consequence, and lead into dangerous errors in practice; e. g. if rarefaction of the blood be admitted as the cause of the direful symptoms which the abuse of opium sometimes occasions, the remedy indicated would be venæsection; whereas some authors affirm, that it is death to open a vein, even the day after a narcotic has been taken ‡; and possibly the woman, whose case I mentioned, (N<sup>o</sup> 10.), having been the day before liberally blooded, was one reason of so small a quantity of opium's proving so suddenly mortal. Besides, if it rarefied the blood, how could it be so useful in hæmorrhagies, small-pox, &c. as it is found to be?

It is by no means necessary now to answer the objections against the use of this medicine in different ages, since it has at last triumphed over all opposition, if it be not the groundless prejudices of the ignorant vulgar, and is not only of more universal use, but does also more honour to medicine than any remedy whatsoever. What could a physician do without opium in many obstinate and terrible diseases, as in violent pains, want of sleep, excessive evacuations, choleras, dysenteries, disorders of the nerves, &c.? How beneficial is it in various fevers, grave, gout, cough, consumption, &c.? In a word, though I by no means think

‡ Vid. Wedel, opiol. l. 2. § 3. c. 3.

think it a panacea, yet I may say, there are not many distempers in which opium has not been sometimes given with good success. *Ita necessarium est opium* (says Sydenham) *in hominis periti manu organum, ut sine illo manca sit et claudicet medicina; qui verò eodum instructus fuerit, majora præstabit quàm quis ab uno remedio facile speraverit.*

## S E C T. IV.

Opium is commonly given to adult persons unaccustomed to it, from half a grain to three; but to such as use to take it, to four, five, or more grains, till it produce the desired effect. The usual preparations are, the extract, tincture, Sydenham's liquid laudanum, anodyne balsam, and pacific pills; and it is the basis of the storax pills, mithridat. theriac, diaseordium, &c.

With relation to the dose, the general rule, viz. That it is safer to give too little than too much of efficacious medicines, is in no instance more to be observed than in the administration of opium, especially seeing its effects appear so soon, that the defect may much more easily be supplied than the excess can be remedied: For, if too much opium is taken, the muscles become soon paralytic, so that nothing can be swallowed, and all we can do is to endeavour to provoke vomiting by tickling the throat, or by clysters and cataplasms of tobacco, and such emetic applications, and at the same time to rouse nature by strong sinapisms, &c. If thus

thus the unfortunate patient is enabled to take medicines after emptying the *primæ viæ*, diaphoretics mixed with vinegar, and such like acids, will seldom fail to complete the cure.

*Extractum opii, vel opium præparatum, off.* is opium dissolved in water filtrated and evaporated to the consistence of honey. "Opium non coctum (says F. Hoffman de opiat. p. 128.) longe promptius somnum movet, et dolores mitigat, quam si diuturna coctione, vaporabili suo principio orbatum fuerit." This *principium vaporabile* is called by others *immoderata et nociva vis opii narcotica*, which they think by all means ought to be separated; our college is afraid of neither, and want only to separate the feculencies or heterogeneous useless substances, and part of the rosin. This extract, if brought to the consistence of opium, is about a fourth part stronger than crude opium itself.

*Tinctura opii, vel laudanum liquidum, off.* is solution of one part of crude opium in ten parts of sherry or Spanish wine filtrated; consequently, eleven grains of this laudanum is equal in strength to one grain of the extract.

*Laudanum liquidum Sydenhami, off.* differs from the former in being aromatised with saffron, cloves, and cinnamon, which rather increase than diminish its virtues; and at the same time correct both taste and smell. *Balsamum anodynum Battei, off.* is a tincture of opium, saffron, &c. in rectified spirit of wine, and is an useful medicine in many cases, both externally and internally applied.

*Pilule pacificæ, vulgo Matthæi, off.* differ much from the *Pilule Matthæi, alias Starkii* of Bates,

and also from the *pilula Starkii*, which Mr Wilson says he had from Dr Starkey's own mouth in the year 1665; who then told him the receipt he gave to Matthews was for a little money, but that which he communicated to Mr Wilson was what he used himself. This account is not much to Starkey's honour; for neither the black nor white hellebore is in Wilson's receipt, and so probably Starkey had no experience of the effect of the composition. Nevertheless Matthews pills, with both the hellebores, gained great reputation abroad, as well as at home. F. Hoffman calls them "*magnæ famæ remedium*," and adds, "*Quod uti sæpius animadvertimus alvum solutam præstat, sudorem efficaciter movet, et nunquam facile torporem gravativum, sicuti sibi relicta opiata efficiunt, post se relinquit.* (Opiat. 139)" Yet Bates says, some dislike the black Hellebore; Quincey leaves out the white; and our college rejects both. These pills are all too resinous to be easily dissolved in the stomach. There is a grain of the extract of opium in about ten grains of the *Pil. Matthæi Bateanæ et Edinburgenses*; in eleven grains of this pill according to Quincey's dispensatory; in about six grains of Starkey's according to Wilson; and in nine grains or so of our *Pilula e styrace*.

It is observed by Gesnerus, Platerus, &c. that the mithridatium without opium, is not sudorific. If this be true of this composition, whereof half an ounce does not contain one grain of opium, much more must it be so of another framed after the same model, and not otherwise

otherwise materially different, viz. the *theriac* and *amachi*, of which at least seventy-six grains contain one grain of this juice. The same may be said of the *trypheras*, *philoniums*, *orvietanums*, and the like numberless *sesquipedalia antidota*, with which authors, both antient and modern, too much abound.

To conclude, I am very sensible that opium is an edged tool, and may do hurt; but it is also a divine remedy, and may do much good. A physician may be too timorous as well as too bold in practice, and the sick oftentimes suffer the one way as well as the other. As therefore I see no reason absolutely to condemn the giving of opium to infants, to weak, plethoric or aged persons, to pregnant women, or in malignant diseases; so, on the other hand, if removing pain, procuring sleep, checking evacuations, preventing a salutary hæmorrhage, or the like, be dangerous or unsafe; he must either be ignorant of the *methodus medendi*, or of the nature of opium, who in such cases rashly prescribes it.

*Auream quisquis mediocritatem  
Diligit, tutus.*——

XIII. *Remarks on the neutral Salts of Plants, and on Terra foliata Tartari; by Dr John Bothergill, Physician at London.*

CHEMISTS, who prepare the lixivial salts of vegetables, generally take care, by the means of hot water, and sometimes repeated affusions of it, to get every thing out of the ashes that is soluble; and when they evaporate this.

this solution, they employ the salt which is obtained from it as a pure alkali in other operations, either not knowing or neglecting the neutral salt, which Boerhaave say † is mixed with it, and is *sui generis*. In an operation which I was lately employed in, the necessity of considering the effects of this neutral salt was evident, and I could determine the genus to which the greater part of it belonged.

An ingenious chemist of my acquaintance, intending to make a large quantity of *terra foliata tartari*, used for that purposed the lixivial salt of fern, carefully made in the country by a person well skilled in practical chemistry, careful and exact. Some of this salt was fluxed, the rest was a clean lixivial salt; each kind was saturated by itself with strong distilled vinegar, eight or nine times the weight of the salt being sufficient of the vinegar to fully saturate the alkali of both parcels; whereas usually fourteen or fifteen times the weight of the salt is requisite of the vinegar to make a perfect saturation.

The saturated liquors being filtrated, and carefully evaporated to a mellaginous consistence, hissed and crackled where it hardened on the sides of the vessel, and did more so the nearer they came to dryness, shewing hardly any marks of a disposition to flow, which commonly happens when the saline liquor is so far evaporated.

No methods which the operator, who is a very expert artist, could then fall upon, served to make the process succeed.

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The chemist having informed me of the case, we could discover no fault in the materials, vessels, or operation; but, suspecting the neutral salt to be the cause of the process not succeeding, we dissolved all the refractory mass in warm water, set it to cool, and had a considerable quantity of neutral crystals, several of them exactly resembling those crystals delineated in tab. I. of your Vol. I. which were procured by Dr Plummer from Mossat water, only ours were more perfect, which was owing probably to the large quantities of materials we had. Most of the crystals were cubical, which joined differently, and mixed with other salts, made a surprising variety of figures which cannot well be described in words; but I have sent some of them of different shapes in a box. It was plain from their figure and taste, and by experiment, that common *sal marinum* made up a great part of what we had. The rest might not unjustly be called partly a *sal polychrest*, partly the essential salt of the plant.

We were obliged to repeat this operation for obtaining those crystals, before we could obtain a salt which flowed and foliated; the crystals deposited each time were more bitter and more pungent, though in form resembling the first we got; the *terra foliata* did not flow nor foliate so freely, nor were the foliations so large or so white as usual.

It is with reason then that Boerhaave orders  
† *sal alcali purissimum* to be used in the preparation of *tartarus regeneratus*, or *terra foliata*

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*liata tartari*; and the dispensatories which order *sal tartari* direct the chemists to a more certain process than when they are left at liberty to employ what they will. The chemists in town here mostly use the *cineres clavellati* in this process, and succeed very well, or make the salt with large foliations, and white; and perhaps this is the only one of all the neutral sapenaceous salts, which is more efficacious the whiter and purer it is.

The principal reason why chemists succeed better in making *terra foliata tartari* with *cineres clavellati*, than with any other of the lixivial salts, seems to be, because those who prepare the potash content themselves with letting cold water run through large tubes, or vats, filled with ashes, till it has washed so much from them as to make a lixivium support an egg, by which operation, little of the neutral salts are dissolved to mix with the lixivium; and probably in drying the lixivium, what of the neutral salt is in it, is forced by the fire to the surface, to form that crust which it takes in burning the straw that is wetted with it.

That the ashes which remain after the pot-ashes or salts are extracted contain much of the neutral salt, is evident from their serving so well the purposes of agriculture, being preferable to sea salt for all such purposes.

How such a quantity of sea-salt should be contained in vegetables, is an inquiry foreign to your design, and therefore I shall not mention my opinion of this phenomenon: I believe it will not, however, be unnecessary to remark,

mark, that physicians ought to consider, that the proportion of this neutral salt, mixed in alkaline ~~succ.~~, is often different; the more is thus mixed, the less acid is required to saturate a given quantity: Hence it frequently happens that the medicine we intend should be perfectly neutral, is very acid, and entirely disappoints our expectations.

With respect to the process for making the regenerated tartar, it may not perhaps be without some use to observe, that the more vinegar is put to it, the foliations will appear larger, and whiter, though it is the more expensive, because, whatever vinegar is bestowed on it, the operator must expect very little more salt than the weight of the alkali made use of.

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† 'Tis common here to prescribe one scruple of *sal. absinth.* half an ounce of succ. limon. To learn how far this proportion was just, I procured six parcels of salt of wormwood, and ~~of~~ salt of tartar, from shops in different parts of the town. I likewise procured a quantity of limon juice, sufficient for all the trials I intended. Half an ounce of this juice was saturated with 18 grains of one of these parcels, and required 32 of another to reduce it to the same degree of neutrality. This difference was owing to the neutral salt contained in the last, which was really procured from wormwood ashes, and carefully lixiviated with hot water.

The specimens of salt tartar were more alike; they varied only from 18 or 19 grains to 23 or 24. The fresh salt of tartar is a pure alkaline salt; If it is exposed to the air, it absorbs the acid contained in it, and thus becomes neutral in proportion to the time it has been kept, or as it has been exposed to the air.

Wherefore, in directing the common saline draughts, it would seem that 14 gr. is a much more suitable proportion than one scruple; and if to this mixture we add a scruple of some absorbent, as crab's eyes &c. we shall probably have a mixture more perfectly neutral, than we shall be able in common to obtain by any other method of prescribing.

The addition of some more than the ordinary proportion of vinegar not only contributes to render the salt finer, as by repeated trials we found it did, but also prevents it from becoming too alkaline; for, was it to be brought to an exact *punctum saturationis* before it is committed to the fire, the heat necessary to evaporate the liquor and flux the mass would render it more of an alkaline corrosive than of a neutral saponaceous nature. This induced me to remark, that its whiteness may be esteemed as a mark of its goodness; it arguing that a proper quantity of vinegar has been used, and it may be rendered whiter and more pure by repeating the dissolution, evaporation, and fluxion.

The *tartarus regeneratus*, taken from the quantity of half a drachm to two drachms, is an excellent alterative and diuretic; and from three to six drachms, is a very mild cathartic, that never sinks the spirits, or raises any violent disorder, and particularly is serviceable to several dropical patients; of its service this way allow me to mention one history.

A married gentlewoman, 48 years old, childless, a little corpulent, was repeatedly affected with an immoderate discharge of the menses; soon after her belly began to swell, her legs grew oedematous, all the symptoms of a dropy appeared. She was treated with the strong and gentler cathartics, diuretics, aperients, and corroborants; but this bad circumstance always attended evacuants either by stool or urine, that they never failed to produce a discharge

charge of blood from the vagina, which sunk her prodigiously. Corroborants, especially of the astringent kind, soon stopt the flux, but at the same time contributed to increase the swelling, by lessening the discharge by urine and stool. She then began to take three drachms of the *terra foliata tartari* once or twice a week; it gave her two or three stools, with a large evacuation of urine, without exciting the menstrual discharge, or affecting her strength; she continued the use of it for upwards of a year, without increasing the dose, or attempting any other relief than what that gave her, which was very great; whether it would have made a compleat cure, I cannot say, for, having taken a rough purgative, she had her days shortened by it.

XIV. *An Essay on extracting the Acid of Sulphur; by CHARLES LUCAS, of the City of Dublin Apothecary.*

THE high esteem and great repute the acid, commonly called oil or spirit of sulphur, has been held in by many of the most celebrated authors, as well antient as modern, together with the repeated calls of some eminent physicians among us for the genuine, induced me to consider of some means of making it with more expedition and less trouble and expence than by any of the ordinary methods hitherto prescribed.

The first method I find directed for extracting this acid, and indeed the most universally received, is that called, *Per campanam, by the bell;*

*bell*; which is liable to so great uncertainty, so much trouble, tedious, irksome, and dangerous attendance upon the process, that few or none have ever reckoned it worth while to prepare it after this manner.

To obviate some of the difficulties attending the operation, I got a kind of bell made with its verge inverted, and a spout drawn from it, after the manner of a moor's-head; this I observed collected the liquor more purely, but was still subject to the chief inconveniency of the plain or common bell: For, at a proper distance from the burning sulphur, above half the fumes escaped and were lost; and removed nearer, it soon grew so hot that none could condense till the sulphur was extinguished, or the glass removed from the fire; which, besides the great waste, must considerably retard the operation.

Both the methods prescribed by M. Charas \* I found liable to as many uncertainties and inconveniencies, as well as that recommended by the late ingenious M. Homberg of Paris, and communicated to the *Academie Royale de Sciences* †, which any operator will readily perceive upon trial, as I have often experienced.

I considered at length that, if a method could be hit on, analogous to the ordinary method of distilling other mineral acids, giving the burning sulphur air enough to support a full clear flame, (which must always be observed), the intention may be answered, and accordingly I  
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\* Pharmacop. royal p. 883. & seq.

† Mem. de l'Acad. An. 1703. p. 39.

contrived the following machine delineated tab. I. which I now use to my great satisfaction. It consists of,

1. A large retort A, with a wide neck B, and a round hole C, proportionable, cut in the bottom of the boll, D. A round bodled gallon retort will admit of a perforation about six inches in diameter.

2. A large receiver E, with a spout F, which not only serves for this operation, but is also very convenient for any ordinary distillation by a retort, especially where a given quantity is to be distilled. For then, by turning the spout to the lowest part, and placing any glass of an equal even bore level under the spout, with a scale of drachms, ounces, or pounds marked upon the side of it, the intended quantity can be drawn off to the utmost nicety and exactness, which cannot be well guessed at in the ordinary receiver.

3. A crucible, or round earthen pot for burning the sulphur in, G.

4. A flat bottomed gally-pot H.

5. A concave glass or earthen glassed plate I, perforated in the middle i.

6. A glass mortar as a second receiver, K.

These I place in the order expressed in the figure. Thus,

Having adapted the receiver to the retort, I place it upon a common round, or a bed of sand L, with the spout turned upwards, suspending the boll of the retort by the neck, lodged in a nich N, in the frame M, for that purpose, with its neck inclining so much to the receiver that the drops may just fall into it.

I place the glass mortar K, under the orifice C of the boll of the retort A, covering it with the concave plate I, with the gally pot H inverted on the perforation in the plate. Upon this I set the crucible G, with about three ounces of flowers of sulphur in it. I set fire to the sulphur, by throwing a bit of lighted coal into it, and then gradually raise the glass mortar K, till the crucible G is just received within the orifice in the boll of the retort. Having another crucible in readiness, as soon as the sulphur is burnt in the first, I put this in its place, with the same quantity of new lighted sulphur; and so proceed till I have acquired as much of the acid as desired.

In this process it is observable,

1. That it is necessary to bedew the glasses with the steam of boiling water, before you set fire to the sulphur.

2. That the operation succeeds best in calm, still, cold, wet weather, and in a damp cellar or vault. But if in dry weather there should be occasion for it, by conveying the fumes of boiling water to the orifice in the boll of the retort, the defect of moisture in the air may in some measure be supplied. Afterwards the liquor may be deflegmated at pleasure to any standard required by the common method.

3. That by the make and position of the glasses, the acid fumes are constantly rising into them (as they are propelled by the fire in ordinary distillation) in so much that they soon

soon seem opaque with clouds, which in a short time begin to condense and trickle down the sides of the glasses in full heavy drops.

4. That the sulphur has air enough to make it burn clearly without any interruption, for want of which the acid would be spoiled by a great quantity of white fuliginous matter, that would be elevated in the nature of flowers, and stick to the sides of the glasses.

5. That the acid thus extracted is of three different degrees of strength or acidity: As. 1. that which condenses in the boll of the retort, and so falls into the lower receiver, before it stands long enough in the open air to augment its weight (as all this kind of acids are known to do) is not much inferior in strength to the acid stigma or oil of vitriol. 2<sup>dly</sup>, That which condenses in the neck of the retort, and in the receiver, is a degree lower. And, 3<sup>dly</sup>, By suspending a bell or moor's-head over the spout of the upper receiver, some light fumes may be caught, and condensed into a small quantity of liquor, specifically lighter, and consequently more slightly acid than either.

I have often endeavoured to calculate the proportion of acid a given quantity of sulphur yields; but such almost infinite variety arises from the temperament of the air, (on which it chiefly depends) or from one accident or other, that I could never be able to ascertain it: But, from the justest and most moderate computation, I judge a pound of flowers of sulphur may be burned in about seven or eight hours under a gallon retort, with a suitable receiver, and will yield about

seven drachms or an ounce of pure acid. And as this acid cannot be collected without some adventitious moisture, and as the air chiefly supplies that moisture, the larger the glasses are for this purpose, the better, for very obvious reasons.

In this process I use the flowers instead of crude sulphur, which is most commonly prescribed, for the following reasons: 1. I cannot find by any experiment, that sublimation divests the flowers of any part of the native acid of the sulphur: If it should, sublimed sulphur (*i. e.* flowers) would no longer retain the natural form, nor indeed any of the characteristics of mineral sulphur; and we find that the residuum, after sublimation of pure mineral sulphur, is no more than a simple, insipid, argillaceous earth.

2. As it is certain that crude mineral sulphur is often tainted with metals and such like foreign matter; so it is highly probable some particles may be raised or elevated in burning, which might otherwise have escaped the subliming heat; and consequently the acid extracted from quick or crude sulphur, may not be so simple and homogeneous as that from the sublimed, or flowers of sulphur.

3. Moreover the crude sulphur will not burn clearly without frequent agitation, which is both tedious and irksome; and I could never find any so pure as to yield an equal proportion of acid with the flowers.

To expatiate upon the virtues and uses of this once famed medicine, would be launching out of my proper sphere, and must protract this

this paper beyond the intended scope; therefore I leave that to the learned in physic, whose business it is, mine being only to prepare, not to prescribe or administer medicines, except *medici jussu*. But foreign as it may be to the intention of these essays, I must beg leave to make some short remarks upon some aspersions thrown upon this acid by some late authors.

The first and most considerable prejudice I find raised against the acid of sulphur, is by that learned physician and ingenious chemist Stahl†, who says it does not pre-exist in the sulphur, and consequently must be a creature of the fire.

How a man of his extensive learning and knowledge should advance such a notion, I cannot conceive, since we find the contrary demonstrable various ways.

1. It is very well known to chemists that copper or iron plates, stratified with sulphur, are in a short space of time corroded, and may by that means be converted into vitriol, which is only done by acid menstrua.

2. We find that plain flowers of sulphur are not at all affected with rectified spirit of wine, but upon the predominant acid's being destroyed or overcome by the admixture of an alcalious salt; (as in the *hepar sulphuris*) the truly sulphurous parts will readily dissolve in it. Here it is observable, that the terebinthinated balsam of

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sulphur,

\* Joh. Daniel Hostii institut. Pharmaceut. part. 1. cap. 2. p. 7.

† Fundament. chym. dogmat. Experiment p. 96. 97. &c.

fulphur, as commonly made, is but little better than an empyreumatic oil of turpentine; but, if made with *hepar sulphuris* instead of the simple flowers, it acquires a stronger and deeper impregnation and colour, and a better consistence.

3. Making artificial sulphur is an experiment familiar to naturalists; the composition consists of some fat, oily, or bituminous substance, mixed with any mineral acid salt; and this is found to produce a mass in every respect answering the characteristics of common mineral sulphur.

From which it seems reasonable to infer, that the acid pre-exists in the sulphur.

Some moderns advance, that all minerals acids differ only *secundum majus & minus*.

That this maxim may hold good, primogenially considered, may, I believe, be allowed; but notwithstanding I think it evidently demonstrable, that all mineral acids differ not only *secundum majus & minus*, according to their greater or lesser degrees of strength and acidity, but also from the several different minerals they are extracted from.

1. The acid stigma improperly called oil, extracted by a most intense heat from blue vitriol (which is of copper) is of a dark brown colour, and the slighter acid called spirit (with equal impropriety) is also somewhat tinged; and their taste is perceptibly more austere and corrugating than that of green or martial vitriol. — Since then we find that all imperfect metals and metallics contain some parts that may be elevated or separated from them by fire, and since the

the acid of vitriols can only be separated by a most intense degree of heat, it is reasonable enough to suppose, nay believe, that this acid cannot be drawn from any vitriol, (which is but a solution of some particular metal or metallic in a certain portion of a primogenial acid, as the learned Stahl, before mentioned, elegantly expresses it) without some particles of the metal or metallic adhering to it. Hence it probably is, That

2. The learned F. Hoffman \* observes, that martial medicaments prepared with the acid of vitriol are rough, austere, and astringent, and so disagreeable to the stomach, that they sometimes occasion vomiting; whereas those prepared with that of sulphur, are endued with more excellent virtues, and are sweet, pleasant, and grateful to the stomach. He at the same time reasonably allows, that the difference between the acids of vitriol and sulphur is more accidental than essential; the former being more gross, impure, and terrene, but the latter pure and homogeneous: Which opinion that great physician and most accurate chemist, Dr Boerhaave †, seems to favour. From this the weakness of their assertion appears, who say, that one is a sulphurous spirit of vitriol, and the other a vitriolic spirit of sulphur. Such seem to be but ill acquainted with the component parts of either vitriol or sulphur.

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\* Clavis Pharmaceut. Schrod. p. 373.

† Element. Chem. tom. 2. Proc. 153.

3. The further disparity of mineral acids is experimentally illustrated by the ingenious Borrelli †, to whose experiments on live dogs, with the acid of sulphur, nitre, &c. I refer the reader.

Since then there is so essential and evident a difference between the acid of sulphur, and its too frequent succedaneum, that of vitriol, and since the former is recommended and extolled by many of the most eminent practitioners in physic, I conceive a method of making it more expeditiously, more cheap, and in a greater quantity, than any yet made public, will not be unacceptable to the learned, to whose candour and judgment I submit this essay.

XV. *Several Accounts of the Success of the Vitrum ceratum antimonii, collected by Dr PRINGLE, and read to the Philosophical Society.*

*A Receipt of the Medicine, and Observations upon its Operation; by Dr YOUNG.*

**T**AKE glass of antimony in powder one ounce, bees-wax one drachm, melt the wax in an iron laddle, then add the powder; set them on a slow fire without flame, for the space of half an hour, continually stirring them with a spathula; then take it from the fire, pour it upon a piece of clean white paper, powder it, and keep it for use.

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† De motu animal, p. 11. Prop. 224.

When I prepared this quantity, it lost a drachm of its weight. The glass melts in the wax with a very slow fire.

I was at first so scrupulous in preparing the medicine, that I wished the degree of heat had been assigned, as well as the space of time necessary in the preparation; but I have since found, that I both vary the time and degree of heat, without perceiving any difference in the operation of the medicine.

After it has been about twenty minutes on the fire, it begins to change the colour, and in ten more, comes pretty near the colour of snuff; by that colour I know it is sufficiently prepared, without attending to the degree of heat, or space of time.

The ordinary dose for an adult, is ten or twelve grains; but, for the greater safety, I commonly begin with six; to a strong man I have given a scruple, which sometimes works so mildly, that I have thought it too weak.

To weakly constitutions, give five or six, increasing the dose afterwards, according to the operation.

To a boy of ten years of age, give three or four grains.

To a child of three or four years, two or three.

This medicine has been practised with success for the dysentery, and the preparation of it kept a secret for many years.

When first it was communicated to me, I thought it so harsh and dangerous a medicine, that I had not courage to try it for some years, and even then I began the dose with one grain, and

and increased it gradually to twenty, which is the largest I have yet given; as soon as I was convinced by a number of experiments, that it was both mild and efficacious in curing the dysentery, I published the receipt in our Edinburgh news papers, being under no promise of secrecy with regard to this, and being resolved never to make a secret of any medicine whatever.

I do not expect that any physician will incline to give a full dose at first, without better authority than I can give to strangers; but the cautious may give a small dose as they please, and make first trials almost in any disease where purgatives will do no harm, and increase it gradually as they find it operate.

I give it in dysenteries with or without fever, whether epidemic or not.

I have tried it often both where bleeding and vomits have been premised, and where they have not, with very good success.

I never chuse to give opiates in the beginning, especially where there is great sickness; because although opium gives great relief to some, yet at other times I have thought both the sickness and purging thereby increased the following day.

I never began with a larger dose than ten grains, because it frequently operates as violently at first, as the twenty grains at last, even upon the same patient.

In its operations it sometimes makes the patient sick, and vomits; it purges almost every person, but I have known it cure without any sensible evacuation or sickness nay, in violent dysen-

dyſenteries, they purge ſeldom with it than without it.

If it purge ſufficiently, or fatigue the patient any way, I intermit a day or two betwixt each doſe, the ſame way as I do with other purgatives.

As I have cured ſome with one doſe, I have been obliged to give others five or ſix, eſpecially when the firſt doſes have been too mild; and I have often thought a weak doſe did no good in chronic caſes.

After the ſecond or third doſe, the ſtools are ſeldom bloody, the grips and ſickneſs are much abated, and the mucous ſtools are leſs viſcid.

Give it with an empty ſtomach, for then I think it operates moſt mildly.

Forbid drinking any thing after it for three hours, unleſs the patient is very ſick or diſpoſed to vomit, in which caſe give warm water as in other vomits.

Beware of giving it for a diarrhœa in the end of a conſumption. I have cured ſome other diarrhœa's of long ſtanding with large doſes of it; but it has failed oftner here than in dyſenteries.

I forbid the uſe of all fermented liquors, and recommend a milk diet with rice or bread, chicken-broth or water gruel.

I give nothing cold, unleſs it be a tea-ſpoonful of gelly of hartſhorn as often as the patient pleaſe, and ſometimes I indulge them with the gelly of currans to reſreſh their tongue.

It may be given ſafely to women with child; and to children on the breaſt you may give half a grain.

G. Y.  
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The next TESTIMONY is two cases which I found among my uncle, Dr. Francis Pringle's papers, wrote with his own hand, and one of which I remember to have been witness to.

A gentleman's servant, about thirty years of age, was taken ill of a dysentery, about the middle of January 1735.

He was bled, had a vomit of the ipecacuanha, and a bolus of rhubarb with sweet mercury, paregoric pills at night after the vomit and purgative, and afterwards an astringent paregoric mixture, which he took from time to time; from all which he had some relief, and the distemper seemed to yield in some measure, but still returned with greater violence.

On the 24th or 25th of January, he was seized with a violent stitch in his side, for which he was bled, and on the 26th he got in the morning the *vitrum antimonii ceratum*, which was to have been given him the day before, but was delayed on account of the stitch. This medicine purged him briskly all that day, but easily enough, without nausea, grips, tenesm, or blood, the stools being mostly serous; that evening he got at bed-time 10 grains of the *Pil. Matthai*, was pretty easy next day, and had only two stools; but the pain in his side returning again, he was once more bled.

28th, The anti-dysenteric medicine was repeated in the morning; it puked him more than the first, and purged him immensely from morning to night, to about, as he expressed it, a hundred times; his stools were serous, without blood or grips; that night the paregoric pills

pills were renewed; he slept well, without grips or purging.

20th, He was very easy, and altogether co-  
sive.

30th, He went abroad, and returned to his master's house, where the air being a little colder, and more piercing, he had next day some gripes, with a tendency to purging; but, having taken his paregoric pills at night, he was pretty well next day.

Some days thereafter he had a return of the disease; and the antimonial medicine having been again given him to gr. xii. for the third time, he recovered perfectly, and had no relapse.

Mr ——— was seized with a looseness, November 29. 1735, attended with a slight degree of fever, drought, stickness at stomach, pains in his belly, especially below the navel; his stools were frequent, for the most part bloody, especially in the beginning.

He was blooded, was twice vomited, had rhubarb with calomel once, afterwards without calomel, paregorics every night, and an astringent paregoric mixture in the day-time, as also anodyne and astringent injections.

Notwithstanding all which, the disease continued less or more violent, though for the most part, after the beginning, without blood.

December 11th, He got in the morning seven grains of the *vitrum antimonii ceratum* in a bolus with conserve of roses, which purged him that day twenty three times, but easily enough without gripes, blood, or much tenesm; that night he got 12 grains of the *pil. Matth.* which checked

checked the purging a few hours; but next day he had near twenty stools, but serous, and without blood or grips: That night he got gr. xiv. of the *pil. Matth.* and next morning (December 13.) he got gr. viii. of the *vit. am. ant.* which purged him as before about twenty-four times, only the stools had more of a consistency, and more like natural; at night he got gr. xv. of the *pil. Matth.*

December 14th, his purging, which had stopped by means of the pills, from ten till three in the morning, returned, and he had that day about twenty stools; at bed-time the paregoric pills were repeated; he had some rest, and was free in some measure of the purging, till seven in the morning, about which time he took a third dose of the *anti-dysenteric* medicine, consisting of gr. x. This purged him plentifully as formerly; that night he got only gr. viii. of the *pil. Matth.* purged eighteen times next day, but easily; had gr. viii. of the pacific pills again at night, and next day (December 17.) had gr. xii. of the *anti-dysenteric* medicine, had 13 stools that day, several of which were pretty natural, and of a consistence, and he was pretty well and hearty.

18th, having taken eight grains of the *pil. Matth.* the night before he had no stool from 11 at night till 8 in the morning, his drought and fever were less, he was easy, stronger, had an appetite, and purged some times that day, but his stools were more natural, and had somewhat of a consistency, took at bed-time gr. viii. of the pacific pill, and had a good night.

19th, he got, for the fifth time, a dose of the

the *vitrum antimonii ceratum* to gr. xii. this purged him about ten times that day, but very easily; that night he took no paregoric, yet slept pretty well.

20th, He had several stools, took that night the pacific pills, had a good night, and purged but twice.

21st, Omitted that night the pacific pills, slept well.

22d, He took a sixth dose of the *anti dysenteric* medicine, consisting of gr. xv. which agreed well with him; from that time he continued in a way of recovery, seldom purging above twice a day.

31st, He was so well that in all appearance he seemed to have got altogether free of his indisposition, and continued so without any relapse that I have heard of.

*A Letter from Mr Andrew Brown, Surgeon in Dalkeith.*

Sir,

IN obedience to your request I send you an account of two trials I made of Dr Young's *anti-dysenteric* powder with success, which was all I had opportunity to make.

The first was on William Loudon at Cranston, aged about forty years; he was so reduced by the dysentery that he could not walk through his house, and, through torturing gripes, could not sit in an erect posture. I saw him first on May 21st last year in this distress; judging him beyond bleeding through weakness, I vomited him with *epecacuan*, and purged him with *rheubarb*,

barb, ordered his diet and drink as usual, to no purpose. I then sent for Dr Young's powders, and on the 25th I gave him three doses, of nine grains each, one to be taken every other day, and ordered him a regimen, which three doses effectually carried off the dysentery, and the remaining diarrhoea and weakness was removed by a strengthening diet.

The other trial was on a young man about 17 or 18 years of age, labouring servant to Mr Cleg-horn, farmer at East houses of Newbottle; he had laboured under the dysentery for near three months preceeding March last, continuing at his work, till, being laid aside therefrom, his master applied to me. I visited him on the 25th of that month; being young, I caused him to be blooded; he had the common symptoms attending the dysentery, with torturing gripes and loss of appetite, but was able to step about. Being a servant, and seed-time in view, I immediately gave him three doses of Dr Young's powder, six grains for a dose, which suppressed the dysentery; but not being quite conquered, on the third of April I gave him three doses more, nine grains each, which effectually carried off the dysentery, so that the young man recovered and returned to his labour at the end of the month.

N. B. He took his doses as the other did, one every other day, and the regimen during the taking was according to Dr Young's direction to me, and, so far as I remember, it did not vomit them, nor were they so much as sick.

*Dalkeith, Jun. 30th, 1738.*

*A Letter from Dr Thomas Simpson, Chandois  
Professor of Medicine in the University of  
St Andrew's.*

*Dear Doctor,*

I Had yours two weeks ago, wherein you desire my observations upon the *stibium specificum* made public by our friend Dr Young; but my being much in the country since that time, prevented my writing them out till now.

The first I gave it to was William Jervey tenant in Pildaff, a young man somewhat above twenty years of age; for ordinary he complained much of nephritic pains, and last harvest of a cough. January 16th 1735, he was seized with the dysentery most severely; I was sent for upon the 20th, when I found, that the night before he scarce had any interruption in his purging, attended with great anguish and sickness, whereby he was so much defeated that he looked like a dying man. I gave him immediately fourteen grains of the stibium; the following 24 hours he was easier; next day he got a clyster of cowswhey and camomel flowers, but was worse: The third day I gave the stibium without observable success; but this I ascribed to cold in going to stool, which he did with his feet on an earthen floor. I had much ado to persuade him to a third dose, being quite dispirited with the severity of his disease, but two days after I at length prevailed; he was sensible of the good effects of this, which made him the easier take a fourth dose, which, of all relieved him most;

so that after that I had little to do but to secure him against a relapse, which I did by a fifth dose, and the regulation of the non-naturals.

I had no other patient under that disease until December, when ~~a woman~~ <sup>in town</sup>, the wife of one Andrew Murray, took it formally with horror, gripes, sickness, drought, &c. I saw her after she had been pretty severely handled with it for ten days; I gave her ten grains *diebus alternis*; three doses recovered her.

In the beginning of April 1736, a young lady had taken for a vomit *mercur. præcipit. Wurtzgr. vii.* at eight in the morning, which at eleven had vomited her five times, but she continuing very sick for twelve hours, it began again to vomit and purge her at the same time; and in this case she continued till nine next morning, when I was sent for. I gave her a dose of *laud. liquid.* which made her easier that day; but next day her purging returned with blood and gripes, I immediately gave her *vit. antimon. cerat. gr. vi.* It was six hours before she had a stool, and then it was free of blood, and taking its natural form.

One Wilson, a boy about fourteen, son of one of the tenants in Magus, for a whole year had been subject to the dysentery, though in an easy manner, being still able to keep his feet. I obliged him to come to town that I might see him from day to day. When I gave him the first dose he was under one of his worst fits. Six grains, or ten at most, was the utmost I went to now with any patient, finding the lesser doses answer best. I gave him only

fix grains for a dose; the first day his first stools were bloody, but the last untinged; the second day he kept easy; the third his stools were again bloody; the fourth he got a second dose, but purged none, and was free of gripes; next day his stools appeared to form, though interspersed with blood, and after this the blood quite disappeared; nevertheless, before he left the town, I gave him two other doses to secure him against a relapse; and, when I inquired about him some time after, he was in good health.

About the same time I gave two doses, of six grains each, to Deacon Addison, an old man about 70, and cured him under a pretty severe attack of that disease.

In June I gave it to David Taylor's wife, tenant in the Brake, in the fifth month of her pregnancy, violently attacked with a dysentery and tenesmus. The third dose carried off the dysentery, and the remaining tenesmus yielded to clysters of Milk and camomile flowers.

Mr Tod's wife of Balmungo, who had got the disease by fatigue and cold, was quite cured by three doses.

February 1st, 1737, William Wilson in the Tosh took the dysentery after the epidemic fever, and was cured by three doses, gr. vi. About this time it turned epidemic to the eastward of St Andrew's, particularly about King's-barns and Craill; many of the boys of this last town were seized; the first who were seized with it were cured by bleeding and purging with rhubarb; but upon stibium being introduced

duced amongst them, the cure was much more speedy. I had several of the country people under this disease at this time, none of which required above the third dose. Its success now was so observable, that some of the gentlemen in the parts where it raged most, applied to me for doses of it to give their poor in the neighbourhood, and I received letters of thanks, with accounts of its observable success, which indeed was so great, that none ever doubted of it where I gave it.

I gave it April 9th to a tradesman's wife in Drumcaro, the 10th day after child-bed, with success.

In May, Alexander Pride's wife in the Chaunch died of the disease; but she was brought very low before she got it, and drank under it large quantities of cold water, as she had done from the first; so that none blamed the medicine, which at the same time recovered her husband.

I tried the medicine likewise in the *uterine hæmorrhagies*, as you acquainted me Dr Young had done, and that with equal success.

David Symphon's wife in the Tents-muir, after a miscarriage of three months, continued flooding easily for four weeks; the fifth it became so violent that she fainted perpetually, and seemed ready to expire. I sent out two doses, gr. vi. by her husband, who acquainted me of her case. He returned the fourth day after, and told me that, upon taking the first dose, she found it sensibly working through every part of her body, and that in less than half an hour the hæmorrhagy abated; and thus she recovered.

vered so quickly, that he left her in the field with the labourers quite free of her disease.

I gave it to an old woman under an *uterine hæmorrhage*, that had some time been familiar to her, with equal success.

The wife of Andrew Turpie shoemaker had been abortive, without passing all the after-burden; she continued three months after always losing blood, but in a small quantity; at length it increased to a plain eruption, passing sometimes a pound at a time, with faintings and great uneasiness. Though I was satisfied that the womb's distension was the cause, yet I gave her the stibium gr. vi. It gave her more disturbance in her belly than I found in any other case, and thereupon a large quantity of the placenta came away, loaded with grape-like hydatides. Now, whether the forcing this foreigner was only accidental, further trials in such like cases must satisfy us.

An old minister in the neighbourhood, aged 70, had been troubled with gripes for seven or eight months, with now and then a loose belly, and at last came to pass pure blood, to the quantity at least of two or three gills a day. After continuing four or five days in this way, upon his sending for me I gave him gr. vi. The first dose lessened the hæmorrhagy, the second quite cured it.

I gave it to nurses, who, contrary to their wish, menstruated; it put the menstrua off some weeks, but they still returned again; what a more constant use of it would have done, I could not determine.

Thus

Thus you find in what different cases I have given this medicine, and how effectually, in dysenteries of long and short continuance, epidemical, and others, and in the haemorrhagies of the uterus and intestines, in which I could not desire more certain proofs of its success than I have had: That there are many cases in both diseases in which it will not succeed, no body will doubt, considering the different kinds we are subject to: But that it is a true and successful specific in most is as certain as that the bark cures agues and gangrenes. So that in my order of medicines I have made it the second for its true and observable qualities; for a specific I must term it, since I find that six grains, without purging or the least disturbance, answers our intentions in most cases. How much the world is indebted to Dr Young for making it public, every one who has tried it must be forced to confess.

St Andrew's, Jan. 2. 1738.

*A Letter from Mr John Paisley, Surgeon in Glasgow.*

Sir,

YOUR laudable endeavours to promote the art of medicine, and particularly in recommending the *stibium ceratum*, not only in fluxes, but in *uterine haemorrhagies*, which I had an account of a good time ago from my Cousin Dr Simpson at St Andrew's, and from other good hands since, makes me hope you will more easily pardon the freedom I take of acquainting you with the success I have had in using

using it, though I have not the happiness of your acquaintance; and beg the favour, if you can spare so much time, as to let me have an answer to a query or two I subjoin.

When I at first used that medicine, I procured it from <sup>Edinburgh</sup> by means of Mr Stephen Surgeon to General Whetham's regiment, who can vouch for its effects in a great many cases, where he and I attended jointly both some of the town's people and his own men. At first we gave only seven grains in a dose, and to some strong persons increased it by degrees to 13 or 14 grains, and proportionally less to weak and younger patients, made up in a bolus with *conserv. rosar. diascord. theriac. Edinens.* allowing for drink water-gruel, sometimes with, sometimes without milk at other times emulsion, tea, or weak broth and always an opiate after the operation. It sometimes vomited, always purged, and without griping, or but very gently. When it occasioned vomiting, it made them very sick before the operation; but, so soon as it wrought downwards, that went off.

When the parcel I had from Edinburgh was done, I made it by the directions given in the Edinburgh Courant, making use of white wax to besmear the laddle, and did not bruise the stibium: After keeping it on the fire the time ordered, I could not rub off any wax: When it was cold I rubbed it fine in a marble mortar. Of this kind I gave only three grains, and never above five even to strong persons, and found it wrought as well as what I had from Edinburgh, and in the same manner, notwithstanding.

standing the disproportion in the doses. I did not keep a list of all the patients to whom I gave it, but I am certain I gave it to above forty, who all recovered except three, where I could not blame the medicine.

As the disease was epidemic, and the patients generally were seized with a fever, at the beginning, in most of them I took away some ounces of blood before using of it, giving it every other day, and in the intermediate days a light cordial; and, if there was great pain in the lower belly or rectum, an emollient clyster, with the yolk of an egg. Four or five doses perfected the cure for most part, when taken in time. In others, where it was of long standing, I have been obliged to go the length of twelve or fifteen doses, and never once saw any bad effect from it. I have tried it in diarrhoeas, dysenteries, and colic-pains from viscid stuff in the intestines, and found it in all these cases a safe easy purgative, and sometimes a gentle emetic, and a much surer and speedier cure than the ordinary methods, which I used with a great many patients at the same time, &c.

*Glasgow, Feb. 6. 1738.*

*A Letter from Mr James Stephen, Surgeon to General Whetham's Regiment.*

Sir,

BEING informed you wanted to know the success of the *vitrum antimonii* given in dysenteries, is the reason of my sending you this. For these three last years dysenteries have been

been epidemical not only in the regiment, but in all the places where it has been quartered; and not finding the desired success from the common method of cure, put me on making all the inquiry I could for an improvement. I at last happily met with the *Stimulum antimonii* in an apothecary's shop in this town; and the character that was then given me of it encouraged me to make a trial of it. On my return to the regiment, then at Glasgow, in December 1735, I communicated my design to Mr John Paisley Surgeon, who desired to be present on making the experiment, and who, to my knowledge, has constantly practised it ever since.

Our first patient was a labourer in a sugar-house, (these people are very subject to that disease); he had been confined to his room six weeks, and to his bed ten days before we saw him; his pulse was low and frequent, his stools bloody, with a constant griping and tenesmus. We began with giving him two grains of the medicine, which gave him one puke, and five or six stools that day; he had an opiate in the evening. Next morning the griping and tenesmus was much abated. We repeated the medicine every other day, till it was augmented to nine grains, by adding a grain to every dose, with an opiate always that evening he took the medicine, which entirely cured him; and in six weeks from the beginning of the cure, I saw him working in the sugar-house, and he has continued well ever since.

Since December 1735, I have had an hundred and ninety patients in dysenteries, who were

were all treated after the same method as above, of which I lost but one, who turned hectic, and died about the thirty-sixth day of his being taken ill.

N. B. I never gave it where there was a strong fever, hectic disposition, or signs of a *diarrhoea colliquativa*.

Canongate, Feb. 6. 1738.

I shall conclude by reading the strongest testimony of all, in a letter wrote to me by Mr John Gordon of Glasgow, whom I am not acquainted with, but whose character we know to be that of an eminent surgeon, and an honest man.

Sir,

I Give you the satisfaction you desire with a great deal of pleasure. In harvest 1736, we had a great many people afflicted with the diarrhoea and dysentery. which carried off severals. At that time I began to try the *stibium ceratum*, and gave it to some hundreds, and since never missed of success, excepting one or two cases, where the patients were quite exhausted before they got it.

I prepared it as fine as we do calomel; three grains of this fine powder is an ordinary dose; I never exceeded five; one or two doses frequently perfected the cure, and seldom I gave three; they got the dose in the morning, and were often two hours before it operated; some it only purged, others it both purged and vomited, and made them pretty sick for six or eight hours; always at night I gave a good dose

Use of opium. Lately a boy of ten years of age had tried for some weeks the common method, with ipecacuan, rhubarb, and *decoct. dia-scord.* to be cured of a very bad diarrhoea, to no purpose, his looseness still returning; he was cured with ~~the grain of the~~ fine powder, and a dose of *liq. laud.* and continues well.

Glasgow, Jan. 18. 1738.

XVI. *A Skull uncommon for the Number and Size of the Ossa triquetra*; by ALEXANDER MONRO, P. A.

It is, you know, my business in teaching, to shew the young gentlemen, my pupils, not only the structure which generally obtains, but likewise as many of the useful *usus naturæ* as I can. By useful, I mean all such as can assist them in explaining the animal oeconomy and diseases, or can prevent their committing mistakes in practice. Among these deviations from the ordinary structure, I reckon the *ossa triquetra*, which are sometimes seen in the several sutures of the cranium, but more frequently in the lambdoid than in any other; for, without being acquainted with them, one may judge a slight wound of a person who had such bones, to be a violent fracture of the skull.

Among the different skulls in my possession, there is one which has these bones more remarkable than any I have seen; and therefore several years ago I caused Mr Cooper to engrave the figure of it in copper, which I now send you to insert in your essays, if you think fit.

Tab. fig. 1. represents the posterior view of the cranium, where the several pricked lines from AA terminate in *ossa triquetra*, placed in the upper part in the lambdoid future. BB are the holes of the parietal bones, much larger than in most skulls.

It was needless to cause the two other figures which are on the same plate to be deleted, and therefore I had as well mention what they represent.

Fig. 2. is the vomer of a young child, in nearly the natural situation; *a* is the lower part which rests on the palate-plates of the palate and maxillary bones; *b* the posterior edge between the back part of the palate and the back of the skull; *c* the wide hollow for receiving the thick spongy *processus alveolosus* of the *os sphenoides*; *d, e*, the serrated superior edges receiving the cartilaginous *nasal plate* of the *os ethmoides*: From *e*, to the point *f*, this plate is cartilaginous even in adults.

Fig. 3. is another view of the same vomer, where the same letters point to the same things, only the inferior side *a* is put uppermost, and brought in view to show the little rising in its middle *z* which enters between the palate-plates, while the sides are depressed.

XVII. *Supernumerary Teeth*; by Dr GEORGE THOMSON, Physician at Maidstone.

THE histories of double rows of teeth in the human head, and the observations of supernumerary teeth sometimes seen are generally so inaccurate, that there is no judging how

Fig. 3.



Fig. 1.



how they were placed, or what advantage or impediment they were in the functions of the mouth; a figure taken from a skull which has such supernumerary teeth, where their situation can be observed exactly, may not therefore be unacceptable.

Fig. 1. is the anterior view of the bones of the upper jaw. Upon comparing the two *os maxillaria* here, one sees how much of the right *os maxillare* is taken away to allow the tooth B. to be seen.

Fig. 2. is the part of the right *os maxillare* below the cross line A in fig. 1. cut off and viewed on the posterior part, that the socket B, where the tooth D, fig. 1. was lodged, might be seen.

E the tooth, which has all the characters of a *dens caninus*.

Fig. 3. is a view of the under part of the maxillary bones of the same skull where the tooth G, represented in the former figures, appears in the right side, and the tooth H is seen coming through the palatal lamella of the left maxillary bone.

The two uncommon teeth, which were both of the same form with the canini, had their roots set slanting obliquely upwards; so that their points were very near contiguous with the natural dog-teeth.

These teeth standing out thus from the roof of the mouth, must have been exceedingly troublesome in chewing, speaking, &c. the tongue being in constant danger of being wounded by them, notwithstanding which, their situation and form would have made the pul-  
ling.

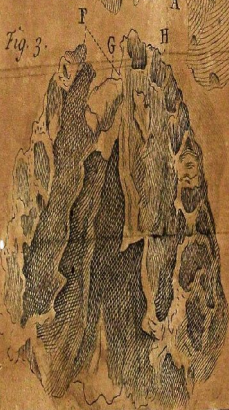
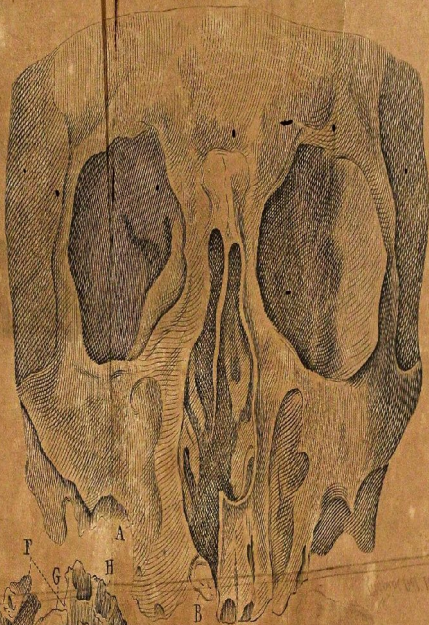
ling of them a very difficult operation, which must have had troublesome consequences; because the palate lamella of the maxillary bones would almost necessarily have been broken, before the teeth could have been got out; how much of these lamellæ would have come away with the teeth, or how far the fracture in them might have been extended, would have been altogether uncertain, and a communication, larger or smaller, might have been made between the mouth and nostrils, the effect of which might have been as bad as to speaking, deglutition, &c. as we see when there is a natural defect of bone, or an erosion of the palate by an ulcer.

If such teeth lurk within the membrane of the palate, might not they occasion several disorders which we could not know how to remove, unless we discovered the cause of them, and cut through the membrane, to make way to these irritating pain-giving bodies? Should not we then examine carefully whether teeth growing in an unnatural way, do not form the tumors which are sometimes mistaken for exostoses, or hard scirrhuses of the palate?

XVIII. *The Mechanism of the Cartilages between the true Vertebrae*; by ALEX. MONRO, P. A.

SEVERAL of you, gentlemen, saw what was shewed here last winter, as a strange uncommon fish, by a soldier. It consisted of two round plates of bone, with a flexible tough substance about  $1\frac{1}{2}$  inch thick, interposed between

Fig. 1



Majoret Del. R. Cooper Sc.

een them and connecting them; no pressure could force the middle central part of the plates nearer, but upon pressing any side of either of the plates, they approached each other, the intervening substance at the pressed part rising outwards into a convexity, while the opposite side, where the plates were separated, stretched considerably; all these motions seeming to be performed upon a solid firm substance placed in the center.

Some of the young gentlemen who studied under my care, searched along the sea-shore, till, near to Granton, where a young whale was cast ashore a few years ago, they found such another body, and seeing the vertebræ of the whale near to it, they were so obliging as to bring it, with one of the vertebræ, to me.

Upon comparing the surfaces of the plates with the flat surfaces of the body of the vertebræ, it was at first sight obvious, that the plates were no other than epyphises separated from two adjacent vertebræ, and the intermediate substance was the cartilage interposed between the vertebræ. Upon cutting the soft ligamentous substance, its concentric fibres shewed themselves, and it became softer gradually till in the center, where it had resisted all pressure formerly, it was altogether in a liquid form.

The view of the play of these two plates, by means of the interposed ligament, with a liquor in the middle of it, served to explain to me the design of the structure of the cartilages between our vertebræ, which I was at a loss to under-

understand before, though it is of the greatest advantage.

The mucous part of this ligamentous cartilage in the human body is placed near to the posterior part of the bodies of the vertebræ, and therefore is nearly in the middle between the anterior part of the bodies and the oblique processes of the vertebræ; so that, when we stand erect, each vertebra rests upon a fluid fulcrum, or sort of pivot, the motion upon which to any side is easily and quickly performed, and, at the same time, is not too hasty or unequal; for the compressibility of the cartilages gradually increases from the liquid central incompressible part towards the circumference. Without this central pivot in moving the spine from any reclined posture to the opposite one, particularly in moving forwards a spine that was reclined far back, there would often be the greatest danger of a most violent shock of one vertebra upon another, and, indeed, of all the parts of the body supported by them; whereas this contrivance allows a very gradual change of the center of motion of each vertebra, accommodated to the bearing of the superincumbent weight in the different deflections of the spine from an erect posture, or in raising it to such a posture.

This liquid fulcrum too, will bear off the great pressure which the vessels of the ligamentous cartilaginous substance would suffer in our erect posture, that might be of ill consequence, while the absorption of this liquor, increased by strong pressure, will serve to account in part for

for the difference of stature at night and in the morning.

XIX. *Reflections and Observations on the seminal blood vessels; by the late Dr GEORGE MARTIN, Physician to the American Expedition.*

It is in suspense what to think of the possibility to deny the existence of these patent anastomoses of, especially now vessels, or even be wiser of such universal authority and parts of the body asserted them in so remarkable a manner, proposing these vessels as having in this respect a peculiar structure, different from all other parts of the body, and so introducing a particular sort of secretion nowhere else to be found. Ever since I have been inquiring into the works of nature, I have always loved and admired the simplicity of her ways, and consequently have not been very forward to multiply in my mind the methods of her acting; and yet, on the other hand, I was not a little perplexed when I considered the great and weighty reasons for a singularity in this case, especially if the number, and I may add too, the character of the asserters of it was to be considered.

2. The doctrine of these anastomoses is so far from being new or singular, as some are apt to fancy, that it seems to have been a standing doctrine from the restoration of anatomy in the beginning of the sixteenth, till beyond the middle

middle of the last century. Vesalius \* talks of the spermatic veins and arteries as meeting and interwoven together in a peculiar way; Fallopio † seems to allow something of this same kind in men, but the rest of the anatomists of that age make no distinction, reckoning the same thing to obtain equally in both sexes; and so the great Eustachio ‡, in all the figures of the spermatic vessels he had occasion to paint, whether in men or women, seems to have paid no regard to any difference which he might have observed. He does not seem to have performed, and, at the same time, to have thought of, any dissection of the spermatic arteries to be so interwoven with the spermatic veins, or unequal; for he says, “*vena arteriam, arteria cartilages præceditur, si- que præclara illa, et admirabilis, ac aspectu jucundissima, a Græcis hominibus vocata αναστομασις; quod genus αναστομασεως, si in corporum dissectionibus te accuratum præstabis, in aliis quoque partibus comperies, in brachiis præsertim et cruribus;*” all which he may seem to have borrowed from Nic. Massa ||. And so this, or something like it, continued to be the universally received opinion, and was so common in the days of De Laurent ††, that he expresses himself in these remarkable terms: “*In plexibus his vasorum spermaticorum conspicua est præclara illa et tantopere celebrata venarum*”

\* De hum. corp. fabr. v. 13. 15.

† Obs. anat. op. tom. 1. p. 422. & Vesal. oper. 175. p. 751.

‡ Tab. anat. xii. fig. 1. 3. xiii. xxv.

§ De re anat. xi. 13.

|| Anat. lib. introd. xix. p. 33. xxiii. p. 40. xvii. p. 35.

†† Hist. anat. vii. 25.

venarum et arteriarum anastomosis." And  
 for down as beyond the middle of the last cen-  
 tury most anatomists continued in the same way  
 of thinking, and particularly one of the greatest  
 of these times, Dominico Marchetti \*, speaking  
 of the spermatic vessels, says, "Arteriæ anastomo-  
 sin in progressu cum venis patentem faciunt;"  
 so that this seems to have been the prevailing  
 opinion of anatomists until De Graaf † dared  
 positively to deny that there were any such thing  
 as these patent anastomoses between the sperma-  
 tic vessels, or even betwixt the arteries and veins  
 in any other parts of the body; being however  
 cautious enough to let us understand, at the  
 same time, he did not absolutely deny that the  
 ordinary circulation of the blood, from the very  
 minute arteries to the beginning veins, might be  
 carried on by their mutual joining or inoscula-  
 tions, as now every body knows from the observa-  
 tions of Malpighi, Leewenhoek, and others.

3. But Leal Lealis being dissatisfied with De  
 Graaf's account of this and several other things,  
 undertook to give a new scheme of these mat-  
 ters in his epistolary exercitation, *De partibus*  
*semen conficientibus in viro*, in which he keenly  
 defends the existence of the anastomoses betwixt  
 the trunks of the spermatic veins and arteries  
 against De Graaf; however, with this remarka-  
 ble difference from the preceeding authors, that  
 instead of patent communications, as Marchetti  
 and

\* Anatom. vi. p. 58.

† De vir. org. &c. p. 24. & epist. ad Sylv.

and others had represented them, he (though dressing himself to the same Marchetti, and loudly approving of every thing he says) calls them *tenues, et invisibiles fere anastomoseis* \*; and, if he had pleased, he might have kept out the modifying particle *fere*, since, notwithstanding his ordinary impetuosity, he is so far from pretending ever to have seen them, that he openly acknowledges † he asserted them, not at all because he could receive them with his eyes, but by reason of the close union of the femoral blood-vessels; and chiefly, that the effects of some particular experiments and phenomena necessarily supposed some such anastomoses; which experiments and phenomena, we may be pretty well assured, neither Eustachio nor Colombo, nor any other before Harvey, ever tried or considered in that light, however laborious and exact they might be in other things; since Leal's reasoning is entirely founded on the circulation of the blood in a living animal.

4. The substance and strength of Leal's arguments ‡ for his favourite anastomoses of the spermatic vessels lands in this, that, cutting off all communication betwixt the arteries and the testicles in a living animal, yet the blood, without great difficulty, finds a way to return by the veins; and this phenomenon, I do readily conceive, may be easily understood and explained without acknowledging the existence of the extraordinary anastomoses in question, which he with so much assurance deduces from experiments

\* De part. fem. conf. p. 20.

† Ibid. p. 26.

‡ Ibid. p. 18. 19. 20.

nents of that nature. Let us only consider that, when one ties all the *vasa preparantia* above the testicle, or by any other means takes away all communication between the artery and vein by the intermediation of it, yet there is still left a passage, though a very straitned one, by the common course of the circulation, without supposing lateral short openings; and the branches of the spermatics that arise all along their progress, and are distributed to the neighbouring membranes: which lateral branches Leal did not think of, though described by Galen \* and others, and carefully expressed by Vesalius † both in his text and figures; and now we find them finely pointed out by the inimitable and accurate Eustachio ‡.

It is however worth while here to take notice, that this passage of the blood in the lumbar membranes is not near so free and ample as its direct course through the testicle itself, at least, if we can give credit to an experiment of De Graaf ||, the truth of which Leal †, though otherwise not very favourable to him, has not offered to call in question, although he was forced by a poor shift to deny its conclusiveness for the purpose De Graaf designed it. He then, making a ligature on the lower end of the *corpus pyramidale* in a dead animal, found that a liquor injected into the trunk of the seminal

\* De dissect ven. 8.

† De hum. corp. fabr. iii. 9. v. 13. fig. 20. 22 23 25.

‡ Tab. anat. xii fig. 3. xiii. xxv.

|| De vir. org. p. 24.

+ De part. sem. conf. p. 22.

minal artery was immediately stopped; that it seems it could not be pushed through the strait communications on the surrounding membranes into the trunk of the spermatic vein, through which the liquor returned plentifully and easily as soon as he took off the ligature, and so allowed it to run by the natural passages and communications in the testicle. By which experiment it is plain that the inosertions of the arteries and veins and about the testicle are more ample than are communicated on the have all the way down.

6. Since then that lateral passage of the blood is so very strait, and since Leal does not pretend ever to have seen the communicating canals of the seminal veins and arteries, is it not surprising that Dr Boerhaave, in the first edition of his institutions \*, and more fully in the second †, should, on Leal's single authority, affirm, that *arteria spermatica emittit ramulos arteriosos, qui recta, patenti, satisque magna via, in venam comitem cruorem arteriosum lateraliter derivent vera anastomosi, in primis in pyramidalis corpore*? How can this *patens satisque magna via* be fairly deduced from Leal's invisible anastomoses ‡, or be reconciled with De Graaf's experiment? Which too evinces not only the existence, but the largeness and openness of the veins of the testicle; though Dr Boerhaave § is pleased to deny the body of the testicle any considerable returning veins.

\* Sec. 210. 451. 452.

† Sec. 262. 642.

‡ Ibid. p. 26.

§ Ibid. § 644. 647.

veins corresponding to its arteries, allowing it only some *venulae exiguae et vascula lymphatica*, according to Leal's \* flaunting assertion, when he affirms that *nulla est vena quae nervea membrana pertusa, testium audeat sacra invisere penetralia, omnibus veluti sua in nerveam membranam terminatione contentis*. I shall not take time to present to examine his reasons and illustrations of such an odd doctrine; it is needful only to cut open and to look upon any human testicle to observe a beautiful distribution of red vessels, both veins and arteries, on the inside of the *tunica albuginea*, every where throwing off very considerable branches into the substance of the testicle; all which is very well described by Vesalius † and others ‡, and most elegantly delineated by Eustachio ||.

7. Indeed it is the assertions of so many good anatomists, and especially those pictures of Eustachio \*\* which I think furnish the best argument for asserting the controverted inosculations between the seminal trunks: and so Dr Boerhaave, in the third edition of his book, adds the lately discovered tables of Eustachio to his citations from Leal; but these are ill yoked together authorities, and not at all flowing from the same view of things; the thoughts and design of Eustachio are very different from Leal's

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\* Ibid. p. 20, 29, 30, 34, 35.

† Hum. corp. fabr. v. 13, fig. 23, Q R. S. T. V.

‡ See Casser. tab. anat. viii, 13, fig. 5. De Graaf, ibid. tab. iii, fig. 5, tab. iv, fig. 2.

|| Tab. anat. xii. fig. 6. 8.

\*\* Ibid. fig. 1, 3. tab. xiii, xxv.

hypothesis of the seminal anastomoses. The antients were not apprised of the foundation of Leal's reasoning, and he, on the other hand, expressly gives up the only reason the antients pretended for them, to wit, ocular inspection; and this single consideration would, I doubt not, tempt most unprejudiced people to suspect that those anastomoses were entirely supposititious, and the whole to flow from some testis. Would not they be ready to think, if there really were any such mutual unions, or patent communicating canals, as the old anatomists seem to think, and as Eustachio seems to delineate, they could have been impossible they could have escaped the eyes of Leal, who searched expressly for them on purpose to maintain the existence of anastomoses against De Graaf? But, after considering this matter more narrowly, I cannot acquiesce in any such reason for doubting the exactness of Eustachio and other good anatomists, when, throughout all Leal's dissertation, I observe such an air of negligence, and such a want of attention to the works of nature, and of respect for the writings of authors better than himself. However, now I think I can account for Eustachio's pictures, and other anatomists books exhibiting visible anastomoses, without admitting any such extraordinary fabric in the spermatic vessels, as is no where else to be found in the animal machine; I mean, without admitting patent, and more than barely visible, short, lateral, communicating canals betwixt the cavities of the arterious trunks, and of their corresponding veins.

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Tho' this undertaking may look like a paradox, I hope in few words to make it good from anatomy and nature itself.

8. After having dissected and looked into several subjects particularly for this purpose, without any great satisfaction, I at length, in December last, 1722, got the body of a very young girl, who before her death had probably laboured ~~in~~ an universal inflammation, or at least was so full of blood, that the coats of almost all the considerable arteries were covered over with a close net-work, of red blood vessels, whereof too I observed a great many on several veins, especially the large ones. After then I had dissected some other things, I turned over to the right spermatics, where I observed, that though the artery was but small, yet its coat was covered with a vast number of red vessels; there were not indeed very many at its beginning, but in its progress downward seemed to be more and more numerous, so that at its passage into the pelvis it seemed to be entirely covered over with a thick stratum of very small vascular canals, though still conspicuous, as yet keeping their red colour; the number however of these investing vessels was so very great, that the artery seemed to be smallest at its rise from the aorta, and to be increased in its descent, which Mr Cowper † and Dr Keill ‡ thought to hold universally in the human spermatic arteries. This appearance however, I believe, at least in my subject,

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† Anat. hum. bod. introd. and expl. tab. xlii. and tab. xlv. fig. 2. and Phil. Trans. abn. v. l. p. 329.

‡ Anat. ii. c. 15. Pl. iv, p. 150.

was entirely owing to the increasing thickness of the sides of the artery, by a distension of a great number of the compounding vessels, while I think it reasonable to suppose that the real capacity of this artery was so far from being enlarged, that it was rather considerably diminished by sending off such a number of lateral branches to the cellulous membranulae surrounding it; for this gradual diminution I have visibly observed in the spermaties of some other subjects, according to the common law observed in the arterial system through all the rest of the body. But, what is more to our present purpose, and what I was prodigiously delighted with, was, to observe at several places pretty considerable branches rising from the feminal vein, and as soon as they reached the trunk of the feminal artery, spread up and down upon its sides; when, with inexpressible pleasure, I found the same appearance on the left side of the body. I compared this observation with one I had made some time before on the body of a middle aged woman, whose right feminal artery, which I examined very carefully, was pretty large, and from which I easily observed in one place a considerable enough branch arising, and just as it reached the vein, dividing itself into two twigs, which, the one going upward and the other downward, were spread on its sides; just as in the other subject I observed the branches of the vein distributed on the artery. There was another place where the same thing appeared, though more obscurely; so that I did not mind nor trust so much to this observation as to the

the other I afterwards made on the body of the girl.

9. These short lateral branches of the spermatics rising from the cavity of the one vessel, and distributed chiefly on the coats of the other one, have not hitherto been taken notice of, at least not sufficiently attended to by anatomists; though, as I take it, it may have been an imperfect view of them that led the old authors I formerly mentioned into the notion of visible anastomoses, and might readily enough train any body else into the same mistake; yea, if I had not, with more than ordinary care, traced the continuation of their colour and distribution, I certainly should have thought (as I know some are still apt to think) them conspicuous and patent inosculations; which Dr Boerhaave does so firmly believe, and which he and every body else reckon that Eustachio exhibits in all his figures of the feminal blood-vessels.

10. And yet even these figures may be so explained as to agree very well with my observations; so that we may reckon Eustachio has only painted, and that very neatly too, as far as the smallness of his figures and the engraving of that age would allow, those lateral branches, both of veins and arteries, which do not split again before they reach the sides of their corresponding vessel, on which they are distributed. It is easy to observe the supposed anastomosis or communicating canals by the angle and direction of their rise and course, some to be derived from the vein, and others from the artery, as from their trunk; for it is a common law in the

distribution of the vessels through all the rest of the body, that the branches arise almost always at acute angles with the direction of their trunks, especially if there be not a very great disproportion between them. Thus then in tab. XII. fig. 1. on the right side we see three of these pretended anastomoses, whereof the first going from the internal femoral trunk to the external, I judge, by comparing this with the subsequent figures and the ordinary position of these vessels, to be an arterious canal, going to be distributed on the trunk of the spermatic vein, from which the two lower lateral communications are derived to the coats of the artery. The only one that is painted on the left side I take to be a branch of the artery distributed on the surface of the vein. And again, in fig. 3. on the right side we have, first, one of these communicating canals, taking its rise from what we evidently see is the artery, and thence carried obliquely downward to the vein; and a little lower another with a contrary course going from the vein to the artery. And then, after the same manner, in the following xiiiith table, exhibiting the female organs, there are on the right side, first, two of these short lateral branches coming from the vein to the artery, from the substance of which the blood is carried by these communications to the cavity of the venal trunk; and somewhat lower we see a very small branch springing from the artery, and going to supply the coats of the vein with blood. In tab. xxv. the parts are so small, and some of them of necessity, to make them  
visible,

visible, so disproportioned, that we need not on this occasion mention any thing that might be deduced from it; for there the longitudinal dimensions of the body are but  $\frac{1}{3}$  of what they are in nature, reckoning at a mean standard; and the forecited figures of tab. xii. are but  $\frac{1}{3}$  of nature, while tab. xiii. is designed to show the parts not much less in length (perhaps about  $\frac{1}{2}$  or so) than they really are in a maid of an ordinary stature; so that in it the seminal blood-vessels are represented larger and nearer to their true dimensions than any where else; by which means there is here delineated, not only the natural course of the communicating canals, as in all the rest, but I think I can observe a resemblance or shadow at least of something of more subtilty and elegance, and that is the mouths of them, where they open into their proper trunks wider and fuller than at the other end, where they are to be distributed on their corresponding vessel; which wide openings of branches into their respective trunks is very frequent in the vascular system, and whereof there are several examples in the very figure before us.

II. From all which is there not some ground to imagine, that even these communicating canals in Eustachio's pictures are not, perhaps, designed by the author as anastomoses, but only as little branches arising from the cavity of the one trunk, and distributed on the coats of the other? at least they are well enough painted for such, if we only regard their rise and position, and in such figures more is not well to be expected. And, lest any should think the ap-  
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parent openings of these little canals into the cavity of both trunks sufficient to destroy this conjecture concerning Eustachio's design, let such an one consider how he was limited by the smallness of his figures and the infancy of the graving art; and that, in consequence thereof, not only in this respect, but in tab. xii. fig. 1. about the middle of the spermatics, on the left side, and near the beginning of them in both sides, and on the left side in fig. 3. and in tab. xiii. where they have just climbed over the iliacs in both sides, as likewise about the middle of them on the left: And also on the left, if not on both sides of tab. xv. I say, that in all these places, the artery and vein are represented in such a manner as that one ignorant of anatomy, and only regarding the rules of perspective, would judge them to be joined into one canal, and then to be separated again; and yet we know, that in all the places where Eustachio represents these conjunctions, they are not so closely bound together but that a hand, much less dextrous than his, could easily separate them; and then, I hope, no body will think he was so superficial a dissector as not to know that such conjunctions were not of the two vessels into one, but only the two lying close to one another, and straitly bound up in the investing membranes; and in men the seminal artery is so intimately woven with the perplexed course of the vein in the *corpus pyramidale*, that Eustachio, in tab. xii. fig. 1. and 3. is forced to exhibit them all as joined into one trunk, though he (as in fig. 3. and 5. where the parts are shown larger) and almost all other ana-

anatomists knew what a labyrinth of vessels there is here. In the mean time, whatever be in this conjecture about Eustachio's notion of these communicating vessels, I am sure some, from an unreasonable fondness and wild admiration of the antients, ascribe as difficult things to him and other old authors, and that with a much less air of probability. However, I am not very concerned whether really he had any such notion or not, thinking it sufficient for my purpose to have shown, that the account I have given is confirmed by such a great author, in as far as he, who studied and delineated the true figure and position of the parts so well, and so agreeably to nature, has painted them in much the same position they appeared to me.

12. Now then I would fain hope that I have put an end to the whole controversy about the anastomoses of the spermatic arteries and veins, by showing the ground and rise of a notion so extraordinary in itself, and which, as I said in the beginning, the great Dr Boerhaave is forced to propose as a singular structure and secretion, to which there is nothing analogous in all the body; I humbly think that now the so much admired mystery is laid open; and here we really see nothing more than what is conspicuous all over the body, to wit, arteries sending off small branches to the neighbouring membranes, and the coats of the veins involved in these membranes, and veins doing the same office to their neighbouring membranes and arteries. And so, after considering the whole course of the spermatic vessels, we find no other communications.

cations or anastomoses betwixt them, than what are every where else in all the parts and viscera of an animal, where the arteries, after a vast many ramifications, turn exceeding small, and at length, changing their direction, become venous or returning canals; and these in their progress joining together after the ordinary manner, form the conspicuous and commonly described veins.

P. S. The above memoir was written in 1723, and has lain by me ever since almost neglected, and very little altered, the substance of it having been communicated to very many, and afterwards ingrossed in a much greater work, which I dare not yet venture to publish. I have given things fairly as they appeared to me, and to others whom I warned to look after them in the same way; so that I shall not say much to my friend Dr Mortimer's observation in the philosophical transactions, No. 415. an. 1730, which exhibits so very different and so extraordinary a view of things, and which (if there be not some mistake in the matter) deserves to be confirmed by subsequent trials. Only, I cannot but take this opportunity to observe, that where such large communications are supposed to intervene betwixt the arteries and veins, as he describes, I cannot easily conceive how the circulation could well be carried on through the minute arteries to the parts and organs where they are distributed. The blood, in its ordinary course, has many and great resistances to overcome, and by far the greatest part of its force is spent before it arrive at the large returning veins, (see *Bellini opuscul.*  
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ad Pitcarn, prop. 29. and Hale's Hemaſtat. exp. 9.) ſo that through ſuch large and patent openings, as Dr Mortimer deſcribes, I cannot but think almoſt all the blood ſhould ſlip, where it has little or no reſiſtance, and ſcarce a drop could be pushed forward through the narrow and difficult paſſages of capillary canals, and the ſmalleſt orders of veſſels. Beſide, I beg leave to obſerve a difficulty in the account itſelf. If the arteries were once filled with red matter, ſo ſtiff as a mixture of wax and tallow, and that really ran by the anastoſes into the vein, I cannot conceive how a ſecond blue injection by the veins could find room to paſs from them to the artery.

What if his anastoſes were overſtretched by the injection, and ended on the coats of the veſſels they ſeemed to penetrate? The anastoſes EF and IK only tinged the veins at F and K of a purple hue; which might well happen, tho' the red tincture were confined to the coats of the vein, and its cavity filled with blue. The Doctor does not ſay that he opened the veſſels to examine their contents after the preparation. Nor is it ſaid, that the arteries at E and I, had any tincture from the venous injection. It is remarkable too, that in filling the artery A, the red matter did not find any paſſage into the anastoſis LM, though it is repreſented almoſt as large as the arterious trunk itſelf. This LM was only filled from the vein, and ſo the artery was made to look purple at L, but no arterious tincture is pretended to have been given to the vein at M: A ſtrong preſumption that the canal LM did

did not really open into the cavity of the artery; but that it communicated only with its coats or investing membranes; which was the case of those seeming communications I examined so carefully.

Mr Winslow, in his anatomy printed at Paris 1732, *Tr. du bas ventre*, § 480. 481, shows very well the groundlessness of Leal's reasoning for the anastomoses, though, in doing it, he speaks as if Eustachio was the only man who had known the lateral ramifications of the spermatic vessels scattered on the peritonæum. Nor does he mention one word of the short branches springing from the cavity of the one vessel to be distributed on the coats of the other; though, if he knows them, they well deserved in the present question to have been taken notice of. I know not if it be worth while to take notice of this passage in De Graaf *de vir. org. p. 23. arteria præparans* — “exiguos admodum, et non nisi post diuturnam arteriarum inflationem in conspectum venientes, furculos quandoque emittit, qui in membranis vasorum, præsertim præparantium, ita excurrunt, ut visus aciem effugiant.” I know this will be understood rather to refer to the common membranes investing the vessels than to their proper coats.

XX. *Remarks on the spermatic Vessels and Scrotum, with its Contents; by ALEX MONRO, Professor of Anatomy in the University of Edinburgh, and F. R. S.*

BY the public advertisement which Valsalva gave \* of having discovered ducts sent from the *glandula renales* to the testes of men and ovaria of women, and were made to hope for considerable assistance in accounting for generation and the use of the *glandula renales*. Valsalva dying without explaining fully the discovery he pretended to, Morgagni † related what he found in Valsalva's papers concerning this subject, of which you have given an abridgment ‡, but have not remarked with Morgagni, that Valsalva had not seen what he thought to be a duct of those parts more than once in the human subject.

Soon after Valsalva's advertisement was published, Mr Ranby § described a branch of the artery of the *glandula renalis* sent down to the testes of men and ovaria of women, which he thought Valsalva might possibly have mistaken for an excretory duct: You also took notice of this ||, and begged Mr Ranby to determine, Whether such an artery was constantly or seldom found? Since your question has not been answered by the gentleman to whom it was put,

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\* Giornali di literati, x719.

† Comment. acad. Bononiens. p. 379.

‡ Medical Essays, vol. II. art. 33.

§ Philos. Transact. Num. 387 § 3. Num. 395. § 12.

|| Medical Essays, vol. II. art. 33.

the remarks I have made in dissecting the spermatic vessels of a considerable number of human subjects, may possibly not be disagreeable to you.

1. In the greater number of human bodies, the spermatic artery of each side rises from the anterior part of the aorta, between the emulgent and inferior mesenteric arteries, as they are painted by Eustachius \*, and having each its course obliquely downward and outwards, becomes contiguous to its vein, a knotty membranous substance connecting them here more firmly together than any where else in their progress. The artery descending sends numerous small branches off to the cellular substance it is lodged in, and near to the ovarium in women, or some way above the testis in men, divides into two branches, as painted by Swammerdam † and De Graaf ‡. The larger branch in men is bestowed on the testis, through the substance of which its numerous branches are dispersed every where, as may be evidently seen after a good injection. The lesser branch of the spermatic artery in men is principally lost in the epididymis, though I have frequently traced its very small branches dispersed also on the testicle.——The larger branch of the spermatic artery in women is sent to the ovarium, and to anastomose with the other uterine arteries, the lesser one is distributed to the *tuba Fallopiana*, and *ligamentum latum*.

2. Numerous veins coming out of the testis and

\* Tab. 12. and 13.

† *Miracul. natur.* tab. 1. 2. 3.

‡ *De organ. gener.* tab. 1. A. 12.

and ovarium, unite and separate so often as they ascend to be collected at last with the many branches they receive from the parts they run near to into one large vein, as to deserve the name of *corpus varicosum* or *pampiniforme*. The single vein into which these numerous smaller veins unite, empties itself into the *vena cava*, immediately below the emulgent on the right side, and into the emulgent vein on the left side.

3. Where the artery and vein are contiguous, the venous branches cross over and twist round the artery so, that at first view one would be in hazard of thinking they united into one canal, or opened by a large anastomosis into each other; but by dissecting carefully, and after an injection, one sees plainly there is no such anastomosis.

4. These vessels, while in the abdomen, are on the outside of the peritonæum in their whole course, lying in a cellular substance, over the anterior part of which the peritonæum is stretched.

5. Though the rise and course of the spermatic arteries are commonly as I have just now described, yet frequently there is a variety to be observed here; for in some bodies I have seen one or both spermatics rise from the aorta higher or lower than the ordinary place; in others, I have found them coming from the emulgents, or from the arteries of the *glandula renales*; three bodies are all in which I found this origin of the spermatic arteries from the arteries of these glands or *capsula atrabillares*, as they are called.

6. Instead of one spermatic artery of each side, I have seen several times two in one or both sides, which had their origins in the uncertain way I mentioned the single artery to have.

7. When there has been one artery of a side, rising from the ordinary part of the aorta, I have seen it in one or both sides make an arch upwards before it turned down to the ordinary course. In one subject, a woman, the spermatic artery of the left side ascended from the aorta to pass between the emulgent vein and artery of the same side, and to make a large curve to come at the anterior part of the vein, over which it descended to go to the ordinary course.

8. I do not know if it is worth while to take notice, that I have more frequently met with those deviations from the ordinary structure, or those *lusus naturæ* in the left than in the right side of the body.

9. Notwithstanding the differences of origin or course of the extraordinary arteries, they kept generally in their further progress and distribution to what I described as the ordinary rule, that is, the single arteries became contiguous to the vein near to the middle of the anterior surface of the psoas muscle, and afterwards divided into two branches to be distributed in the manner in which the branches of the spermatic artery commonly are distributed, and where there are two arteries on the same side of the body, they approach the vein in the ordinary place, the lesser one, which is commonly the one deviating most from

from the general rule, serving the epididymis or *tuba Fallopiana*, and the larger one being distributed to the testis or ovarium.

When the spermatic vessels of men are passing out of the abdomen, they insinuate themselves between muscular fibres, which may be said either to be part of the transverse, or of the internal oblique muscle of the abdomen, or of both. What occasions the difficulty in determining the muscle which these fibres belong to is, that the course of the fibres of the two muscles is much the same here, and that the connection of the fibres to each other is so loose, by means of the cellular membrane, as to allow us to separate them as we please, by either leaving them with the transverse muscle, or raising them with the oblique, or giving a share of them to each muscle.

11. The spermatic vessels and *vas deferens*, in going through between the fibres now described, which form a passage that is very easily dilated, carry part of the cellular membrane in which they lay behind the peritonæum along with them, and acquire more from the cellular membranes of the muscular fibres.

12. Besides the muscular fibres between which the spermatics pass, there are others which, instead of continuing their course transversely from the *os ilium* to the *linea alba*, fall obliquely down on the outside of the cellular substance involving the vessels, and go out with them at the oval tendinous ring of the external oblique muscle, which is composed of firm interlaced fibres, and is not easily dilated.

13. In the passage between the muscles, and through the ring, the spermatic cord obtains more cellular substance, and soon is immersed in the common *tunica cellularis* under the skin, to descend to the scrotum.

14. Frequently a slip of muscular fibres is sent off from the external oblique muscle of the abdomen, to join those which passed through the tendinous ring of this muscle, to assist in forming the cremaster muscle of the testis, which lying at first on the out side of the spermatic cord, gradually, as it descends into the scrotum, expands its fibres round the cord over the cellular substance, and at last is spread on the vaginal coat of the testicle to which it adheres very firmly.

15. The cellular membranes on the inside of this muscle, where it covers the spermatic cord, lose their cellular appearance when cut in the same way as is to be observed in what is called the proper membrane of most muscles, which when stretched gently in dissecting the muscles, or by blowing air into it, evidently shews itself to be the same sort of cellular substance as is seen between the skin and muscles. The membranous appearance, however, which the cells within the cremaster muscle have, when collapsed or stretched longitudinally, is what continues the opinion of their being a vaginal coat to the human spermatic cord, which was supposed for a long time to be a process or sheath sent down by the peritonæum in the human body, as well as it is in quadrupeds which were then generally dissected; but the difference is very considerable. For in men the spermatic vessels lie entirely behind

Find the peritonaeum, and there is not any perforation or production from this membrane at the place where the vessels are passing between the fibres of the abdominal muscles; whereas in many quadrupeds, there is a production of the peritonaeum, which covers the spermatic vessels, but allows them to lie loose in the abdomen, analogous to what we see the mesentery does to the intestines; and when these pendulous vessels are joined by their pendulous *vas deferens*, they enter the orifice of a tube formed by the peritonaeum, at the aperture of the abdominal muscles. This tube formed of the peritonaeum, as the finger of a glove is produced from the glove, is continued down to the bottom of the scrotum, and contains the spermatic cord and testicle, which are only connected to it at the posterior part, where its membrane advances to furnish them their more immediate covering, which serves to keep them in a right situation, and to strengthen and protect them.

16. In our erect posture where the moisture of the abdomen falls down to the lower part of its cavity, and where the bowels are always pressing with considerable force at the passage in the muscles, such a tube continued from the abdomen, would have perpetually collected liquor in it, and made us much more subject to herniae, of which there is less danger in quadrupeds, in whom this orifice of the tube is at the highest part of their bellies; but, because in straining contractions of their abdominal muscles, the viscera might be pushed out at this orifice,

riſice, a moveable fatty flap is placed at the lower part of the oriſice, which the bowels preſſed upwards muſt carry before them to cover the paſſage to prevent their getting out, and at the ſame time to defend the ſpermatic veſſels from the preſſure of the bowels; which preſſure in our erect poſture we are much expoſed to, and therefore ſtand greatly in need of, and are provided with a tenſe peritonaeum, to defend our ſpermatic veſſels from it, notwithstanding which, the ſpermatic veins often become varicous, when the belly is much ſtretched.

17. It may be worth while to remark here, that nature ſeems to attempt a contrivance to prevent herniae in men, a-kin to the fatty flap in brutes; whenever men are brought by diſeaſes into the hazard of herniae, from the oriſice of a tube produced from the belly. After the reduction of herniae, a fat ſubſtance has grown out from the peritonaeum, at the rings of the abdominal muſcles, which prevented a relapſe †.

18. Some have thought that the membranous bag, deſcribed and painted by Schrader ‡ and Bidloo ||, from a preparation of Swammerdam's coming out from the peritonaeum along with the ſpermatic veſſels, is a proof of the natural production of the peritonaeum here; but as no ſuch bag is for ordinary to be ſeen, and we know nothing of the circumſtances of the perſon to whom this preparation belonged, while thoſe who have diſſected ſeveral people who had long wore  
trufſes

† Pare, livre 18. chap. 15.

‡ Obſerv. Dec. 2. obſ. 5.

|| Anat. tab. xxxii. fig. 3. and 4.

masses for herniae tell us, they found the remains of the sacs of the herniae of the form which Schrader describes †; it is reasonable to think Swannerdam's preparation was no other than such a morbid sac.

19. In place of one membranous vaginal coat from the peritonaeum, some authors ‡ have described three firm membranes investing the spermatic cord, which they say are aponeuroses from the muscles, through which the cord passes: But as these were only found in the dissection of unreduced herniae, we may easily imagine how this appearance might be the effect of the morbid state of the parts by the thickning of stretched cellular membranes, though there are no such firm membranes to be seen in a sound state.

20. The real structure of the human spermatic cord is, that the spermatic vessels and *vas deferens* carry along with them cellular membranes from the outside of the peritonaeum, and acquire more as they descend, which are at first covered only on the external side by the cremaster muscle, and then are surrounded by it till they come down as far as the superior part of the testicle, when the cellular membranes terminate, and the thin fibres of the muscles are spread on the vaginal coat of the testicle; as is to be seen evidently after putting a blow-pipe into the upper part of the spermatic cord, and blowing

† Le Dran. observ. chirurg. Reflexions sur l'observ. 58.

‡ Du Blegny Zodiac. medico-gallic. an 1. Mens Febr. obs. 1.  
Memoires de l'acad. des Sciences, 1701.

blowing air into the cellular substance.† Rea-  
has given us a pretty good picture of this.

21. In tracing the spermatic vessels accurately we observe, that at the epididymis they pass between two contiguous membranes which can be separated; and if we continue the dissection of these membranes, from each side of the testicle, we bring off a large membranous bag, the part of which that immediately invests and adheres to the testicle goes commonly by the name of the *tunica albuginea* or *propria testis*, while the other part, being reflected down from the epididymis, forms the loose vaginal coat, and the part of it which covers the epididymis, and descends from that to where the cremaster muscle begins to be firmly fixed to it, is called by some late writers the *septum* or partition between the spermatic cord and testicle, which may be considerably enlarged and thickened by diseases and the addition of stretched cellular membranes adhering to the superior part of it.

In the same manner as is here proposed for bringing away the vaginal with the proper coat of the testicle in an empty bag, the membrane of the heart with the pericardium, or the pleura with the membrane of the lungs, or the peritonaeum with the mesentery expanded over the intestines, and with the membranes of the other viscera, over which it is spread, may also be taken out in so many empty bags; and therefore, in the strict way of speaking, none of these bowels can be said to be contained within

† Respons. ad Ruyrch. tab. 2. fig.

within the membranes that are commonly said to invest them.

22. Besides the artery which is named spermatic, there are two others which commonly are sent to each testicle; one is a branch of the artery which furnishes the *vesicula seminalis* and prostatica with blood, that runs upon the *vas deferens* as far as the epididymis: And sometimes I have traced its ramifications on the testicle after a good injection: De Graaf \* represents some part of this artery. The other artery is sometimes sent down through the rings of the muscles from the epigastric; in other subjects it comes out below the duplicate tendon of the external oblique muscle, that goes by so many different names of Vesalius's, Fallopius's, or Poupart's ligament, Douglas's arcade of the peritonaeum, &c. and after giving branches to the scrotum, enters the cellular substance of the spermatic cord to go to the epididymis and testicle. Winslow † has mentioned this artery.

23. Some branches of veins coming away from the *corpus pampiniforme* being joined with others from the scrotum, from a vein which accompanies the artery last described to empty itself into the external iliac vein near to the ring of the external oblique muscle; it is generally considerably enlarged by veins returning the blood from the teguments of the lower part of the abdomen.

24. The oblong testicles are situated obliquely,

\* De viror. organ. tab. 6. fig. 1. H.

† Exposition des artères, § 237.

liquely, so that their convex longest surface is anterior and inferior, while the epididymis fixed to the other side is superior and posterior: their extremity, where the thicker part or beginning of the epididymis is, being exterior and superior, and the *vas deferens* going out from the inferior posterior extremity.

25. The membrane connecting the epididymis to the testicle sinks into the root of the epididymis at the anterior part, and so leaves there a furrow between the testicle and epididymis; whereas, on the posterior part, the surface is smooth without any depression. By means however of the depression on the anterior part, the membranes of the two sides come very near each other, admitting the vessels only between them, which therefore run to the testicle at the posterior side of the epididymis. (See De Graaf's tab. 1. and 2.)

26. The fibres or threads of which principally the testicle is composed, easily separate from each other, and a single thread can be drawn out to great length. These threads are probably vessels, but I cannot determine of what kind, never having made a coloured liquor to enter them.

27. The pellucid firmer fibres that run through the middle of the testicle from the convex side towards the epididymis, dividing it in some measure into equal portions\*, which are commonly esteemed excretory ducts, I believe to be blood-vessels, having forced a colour.

\* De Graaf, tab. 4. fig. 4.

coloured liquor into several of them, by injecting the spermatic artery.

28. The membranous substance under the epididymis \*, generally called Highmore's duct, has no cavity that ever I could perceive, which should certainly however be evident, if it was the common pipe for receiving the liquor from so many excretories as are said to open into it: It appears to be no more than the firm membranes connecting the testicle and epididymis together.

29. It has been doubted whether the *vas deferens* and epididymis were continued tubes or not. To be satisfied in this, cut the *vas deferens* through where it lies on the inside of the *vesicula seminalis*, and take it and the testicle away from the body, press the epididymis from its larger towards its smaller extremity, and from that to the cut end of the *vas deferens*, till you have squeezed out all the liquor you can, taking care, by squeezing with moist fingers, not to let these parts dry too much in doing this; then put up a long pipe into the *vas deferens*, and through it pour quicksilver, the weight of such a high column of mercury, assisted by your fingers pressing from time to time towards the testicle, will make the quicksilver go forward in the tortuous canal about half the body of the epididymis, beyond which I never could make it pass, being, I suppose, stopt there by the liquor, of which the canals were full. By this preparation one sees clearly the

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tubular

\* Highmore & anquist. anat. Tab, 11, fig 1. Lit. 8. 3. de Graaf, tab. 4, fig. 4.

tubular texture of the *vas deferens*, and the wonderful convolutions of it, where it has the name of epididymis.

30. When the spermatic cords pass the rings of the external oblique abdominal muscles, they are lodged in the common *tunica adiposa*, till they enter the scrotum, where no fat is to be seen, but the cords and testicles, involved in their vaginal coats, are immersed into a cellular substance, the cells of which all communicate with each other, so that water or air forced into either side, or at any part, readily diffuses itself through the whole of it; from whence it is evident, that there is no membranous or carnous partition dividing one side of the scrotum from the other. In several subjects air only passes from one side of the scrotum to the other, at its upper part; and, in some, one side of the scrotum is not inflated by blowing air into the other. What has been shewed as a *septum scroti* is the effect of a faulty preparation; either the cords and testes have been violently drawn out at an aperture in the upper part of the scrotum, and their places have been filled with some substance to keep the scrotum distended till it became dry; or the scrotum has been slit open on each side as its fore-part to take out the testicles, after which it has been stretched out on a board, and the penis has been supported to keep the middle substance stretched till all was dry. By a preparation made in either of these ways a firm septum may be formed; but then it is no more than the collapsed cells all glued together in the drying, and such as can be made in any part of the common *tunica cellularis* under the skin of lean people, where there is no fat. If,

If we cut through the middle of the skin of the scrotum, and violently tear away one testicle from the other, we will be likewise led into a mistake concerning the structure of the parts here; the collapsed cellular membrane will have the appearance of a sac inclosing each testicle, and we shall believe the two bags were only applied to each other.——The way to have a right notion of the structure of the parts here, is to distend the cellular substance of the scrotum with air, while the scrotum is entire, and the testicles are in their natural place, and then to dry them; or rather to cut the skin all along the middle of the scrotum of a recent subject, and then to draw the skin gently to each side, cutting gradually what we have viewed sufficiently, and bringing the sides of the incision nearer together from time to time; then we will be sensible that the testicles are connected by cellular membranes which are capable of being stretched to a very great extent, and when collapsed go into a very small space, and that the testicles are every where in such a substance.

31. What should prevent the vessels of these cells from separating an oily liquor into them, as is done generally into the *tunica cellularis* elsewhere, I do not know; but the want of fat here saves us the trouble we might have from the stretching of the skin and spermatic cord by its weight, and we are not so much exposed to bruises and other hurtful accidents, as if the scrotum was larger by the addition of fat.

32. I had occasion formerly \* to observe  
T 2 to

\* Medical Essays, vol. iii. art. 10.

to you, that the cellular substance under the skin, when it has no fat in it, puts on a muscular appearance and wrinkles the skin; it does the same here in the scrotum, and these collapsed membranes entirely compose what is so formally described as a muscle under the name of *dartos*. Whoever will number the *dartos* among the muscles ought to restore the exploded *tunica carnosæ* to its place among the general teguments of the body.

33. The cellular membranes at the upper part of the scrotum are firmer than lower down, and the difference becomes much more remarkable when they are stretched by any disease; this depends on their being connected to the top of the thigh on one side, and to the *os pubis* on the other, and some addition which seems to be made to them of fibres from the tendinous aponeurosis of the *facia lata*, and from the suspensory ligament of the penis.

34. The skin and cuticula of the scrotum are of the same structure as elsewhere, but the little wrinkle called *raphe*, extended along the middle of the scrotum on the lower part of the penis, and on the perinæum, has been thought to deserve particular notice; and, by the cautions that are given to shun it in operations, one would imagine it to be something considerable; to me it appears no more than the skin stretched a little less in the interspace of the testicles than in other parts, and therefore making a larger wrinkle; for, whenever water or air, introduced into the cellular substance, distends the scrotum equally, the *raphe* disappears. An injury done to it, I can assure you,

you, is of no worse consequence than when done to any other part of the scrotum.

35. The principal artery of the scrotum on each side is what comes from the crural artery, and, crossing over the anterior part of the spermatic cord, spreads its branches every where in the scrotum, and a large branch or two is given to the skin of the penis. Other smaller ones it has that come down from the epigastric and pudenda, and I have seen others rise up to it from the branch of the hypogastric, which serves the perinæum.

36. Its principal vein accompanies the larger artery, or frequently is a little higher up.

When I proposed to answer your question, Gentlemen, Whether the artery from the *glandule renales* to the ovarium and testes was constantly or seldom found? I had no design of engaging myself in the anatomy of the scrotum and its contents. So dangerous a thing is it however to begin to scribble, that, not satisfied with writing already ten times more than I intended, I have now the inclination to try what use is to be made of this piece of anatomy in the knowledge and cure of diseases; by taking the *κηλαι* or tumors of the scrotum under examination, I fancy remarks might be made on these diseases which might be useful to the students of physick and surgery. If you shall think what I am soon to send you of service to the young folks, I know you will publish it: If you are of opinion that my remarks are useless, you will oblige me in suppressing them.

XXI. *Remarks on inguinal Herniæ in Men;*  
by the same.

THE viscera of the abdomen cannot fall down through the rings of the muscles to form a true herniæ in the groin or scrotum, without the tense peritonæum covering those rings (§ 16.) is either broken or stretched; the former seems to have been the prevailing opinion in Britain when the name of *rupture*, or *bursten-belly*, was given to this disease; the latter opinion, *to wit*, that the peritonæum is thrust down into a blind bag in which the bowels are contained, is what many operations and dissections have proved to be almost constantly the case.

The situation of the spermatic vessels, (§ 4.) may let us see, that in herniæ the sac of the peritonæum, with the included viscera, must be always placed at the anterior part of the spermatic vessels; and the description of the cremaster muscle (§ 14.) may teach us, that, in descending towards the scrotum, the sac may either enter within the cremaster, or may pass over it at the internal anterior part of the spermatic cord, the cellular membranes of the cord in the former case, and of the scrotum in the latter, yielding to the force pushing the viscera down.

In these cases the form and effects of the herniæ will be a little different.

When the sac descends within the cremaster muscle, the tumor will be more perpendicular, more oblong and tense, because of the bowels

bowels being restrained and confined by the muscle. The septum (§ 21.) will hinder it to descend to the testicle, which (§ 24.) will be felt at the external anterior side of the hernial tumor; and, if the sac with the bowels is pushed so violently upon the septum, as to stretch it, a rising ring will be formed round the sides of the testicle, and the epididymis is concealed.

If the hernial sac falls without the cremaster, it will descend towards the interior side of the spermatic cord; its form will be rounder, and the sac will not be so tense as in the former case; it may go down as far as the testicle, which, with the epididymis, will be felt on its external part. If the hernia is very large, the sac may be so distended, as almost to surround the testicle.

The effects of a hernia on the different parts forming the tumor will be these.

The stretched skin will have all its vessels, particularly the veins, considerably enlarged, which is a common effect of stretching the skin any where, but must be more remarkable here, because of the situation of the principal vein, (§ 36.) the trunk of which is much exposed to be pressed upon. This distension of the vessels must be proportional to the pressure on the vein, the largeness of the tumor, and the time it has continued. A small, floating, recent hernia, will not have its cutaneous vessels so much distended as a very large strangulated old rupture of long continuance.

The cellular membranes, having their cells applied nearer to each other by the stretching, become

become firmer; and, by continuing in this condition, increase their thickness and firmness in the same way as we observed them to do every day in forming the sac of incysted tumors, and in many other cases. Those of them which are annexed to firm parts will suffer most in this way from the pressure; so that we need not be surpris'd at seeing sometimes a cross band, at the superior part of the scrotum, (§ 33.) in hazard of strangulating the hernia, or to observe several membranous lamellæ that appear to be aponeuroses from the abdominal muscles, (§ 19.)

The use of the vessels of the skin, may be applied also to the cellular membrane, whose enlarged vessels will pour out liquors into the cells that are not violently stretched. Hence the scrotum becomes frequently thick in herniæ; and as the liquor is more or less viscid, the thickned scrotum will be more or less hard, so that we may observe it in all the degrees between a watery swelling, and a firm schirrus.

The peritonæum will not only have the sac containing the viscera affected in the way the parts hitherto described are, but where it is stretched within the belly, near to the protruded part, it may be drawn into unequal wrinkles, which will likewise thicken, and may grow together.

The vessels of this depending sac will pour out their liquors in greater quantity; and, if the abdominal liquor is collected in drops, they will drill down into the bag; on which account we meet so frequently with a liquor con-

contained in the hernial sac. When this liquor is mild, it is so far from being hurtful, that it is the best preservative against the concretion of the sac and its contained viscera, or of the viscera to each other.—If this liquor becomes acrid, it will stimulate, give pain, and erode the solid parts.

The viscera contained in the hernial sac, must draw those they are connected to within the belly, which may make these parts also to suffer. Those in the hernia being straitened in the preternatural sac, especially where the membranes are supported by firm parts, which prevent their stretching, as at the ring of the external oblique muscle, the contracted wrinkled peritonæum, or the cross membrane at the top of the scrotum, (§ 33.) their vessels will be pressed; and the returning liquors being most easily stopped in their course, all the vessels below this straitened part will be stretched, and the volume of the parts to which they belong will consequently be increased.

All the hollow viscera having some fluid or other substance contained in them, and such viscera being often engaged in herniæ, their contents may be retained and collected in this depending part, by which the viscera are distended, the vessels are more stretched, and the bulk of them is increased.—The heat of the body and the corruption, which these contents of the hollow viscera are exposed to by stagnating, may make a rarefaction of these contained substances, and consequently a greater distension of the parts containing them.

The distension, obstruction, and irritation,  
may

may occasion pain; and that effort nature makes for being freed of the cause of such disorders which we call a fever, is raised, from which there is danger of all the disorders being increased; the vessels may be more distended, which will increase the irritation and pain; the heat and corruption will consequently increase, and make the distension of the parts greater; the obstruction may become complete, and therefore the parts may mortify. What is now described, surgeons call the inflamed strangulated state of a hernia, the progress and symptoms of which are told accurately enough by most writers on this subject; and therefore I shall not give any detail of them.

If the effort of nature should prevail, and the obstruction be removed by the fever, it must be either in the way of suppuration or resolution, terms so well known, that it is needless to explain them.

In the more favourable of these two cases, the resolution, the viscera and their contained bag, being, while in the inflamed condition, pressed close together, and no liquors being poured out, are liable to grow together; and they always acquire an addition of substance which they do not quit easily; so that they are thicker and firmer afterwards.——In the suppuration, besides the danger of concretion during the inflammation, the pus not having any passage out, may become acrid, erodes the part it touches, and may be taken into the vessels to create various disorders.

When there is no impediment, nature or art can make the bowels return into the belly by

by the same passage which they came out at; and, if that passage can be sufficiently blocked up, a return of the disease may be prevented.

When the bulk of the parts becomes so great that they cannot return by the passage they came out at, or there is a concretion of them to the neighbouring parts, they must remain in this morbid hernial state till their bulk diminishes, or the passage is enlarged, or their concretions are disunited.

The bag in which the viscera are contained in a hernia, having little springy force or contractile power, to make it shrivel itself up into the belly, and being so thin that artful pressure cannot be so well applied to it, and being immediately contiguous to stretched membranes which may grow to it; for these reasons the bowels often return into the belly when the sac is left behind, and being pressed at its upper part by the substance blocking up the passage through the muscles, is made narrow there, or its sides may grow together, while the lower part of it may be filled with water from the abdomen, or from its own vessels \* or, if this does not happen, it shrivels and diminishes. See § 18.

When the viscera are straitened any where in their passage down to the hernia, the spermatic vessels, which are placed behind the sac containing the viscera, must suffer more or less; and thence a varicous *corpus pampiniforme*, thickened spermatic cord from the repletion of its

\* Saviaud. observ. 22. Le Dran, observ. 75.

its cells with liquors, water collected within the *tunica vaginalis* of the testicles, swelling of the testicle itself, inflammation of all these parts, and all the consequences of inflammation, concretion, suppuration, gangrene.

It is evident how variously these different effects of herniæ may be combined, and of what different degrees each of them may be; and their description may serve to make us know them when they happen to any patient.

Though the bowels forming a hernia are generally included in a sac formed by the protruded peritonæum, yet it is not impossible that the peritonæum may be torn by a violent sudden effort causing a hernia\*; or though the peritonæum descended at first, it may be bursted by some external violence†, it may be eroded by pus, or fall away by gangrene‡.

Allowance being made for the want of the sac, the effects of this rare kind of hernia may be easily understood by what was said of the other; and the want of a tense bag covering the bowels, with the history of the cause of the disease and its progress, will make surgeons judge when this is the case.

What I have hitherto mentioned may happen, whatever is the bowel that forms the hernia; but, there are some specialities which attend the several viscera engaged in this sort of tumor, that had need to be attended to.

The intestines and omentum are [the parts which

\* Garangeot des opérat. chap. 6.

† Id. ibid. Mery, Mémoires de l'Acad. de sciences, 1709.

‡ Saviard, observ. 36.

which fall most frequently down, the appearances and consequences of which are well enough described in several of the most common books.

Instead of an entire piece of intestine being thrust out, which commonly is the case, one side of a gut has been stretched out into an appendix cœca, which was protruded out at the rings of the abdominal muscles\*. When this happens the ingesta will not be stopt in their passage towards the anus, and the patient will go to stool, even though a strangulation of the hernia should come on; whereas when the whole diameter of the gut is straitened by a strangulation, the ingesta will be stopt at the hernia; after the guts below it are emptied, the patient passes no more fœces, and the ingesta regurgitate towards the stomach and are vomited.

The bladder has sometimes been found to fall down in a hernia†, the fluctuation of a liquor which can be pressed into the body, to occasion a desire to make water, or to run immediately out by the common urinary passage, are the symptoms by which this species of hernia may be discovered.—The manner in which the peritonæum covers the fundus and back part of the bladder, and the way it is connected to the containing parts of the abdomen at its lower part, would make one reasonably believe that the bladder will not carry a sac of the peritonæum down before it; but that one side of it gradually thrust

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\* Littre, Mémoires de l'Acad. des sciences, 1700. Merz, ibid. 1701

† Ruych. observ. 98. Merz, Mem. de l'Acad. 1713.

between the peritonæum and muscles, would be stretched out at the rings of the muscles to the scrotum, where it would lie either behind or at the internal side of the spermatic cord; and, if it remained there any time, would grow to the contiguous parts.

Though I treat only of the tumors of the scrotum, it may not be altogether inpertinent to mention here, that the other sex have had the uterus thrust through the rings of the muscles to form a hernia\*, which there would be a difficulty to discover if there was no child in it, whose stirrings would lead us to the knowledge of the contents of the hernia.

If the progress and symptoms of any tumor in the groin and scrotum are accurately enough examined, one who is acquainted with the seat and nature of the different diseases which happen here, will seldom be in danger of mistaking any other disease for a hernia, or of judging a hernia to be some other disease.—One of the cases which would be most liable to occasion a mistake, is a testicle lodged either naturally at the ring of the abdominal muscle†, without having been observed till some accident makes it swell and be pained, or a testicle retracted thither by inflammation or contusion‡.——No testicle being found when sought for in the scrotum, the figure and greater hardness of the knot in the groin, and the absence of the most common symptoms of

\* Michael Doring de hernia uterina epistola

† Pare, liv. 8. chap. 18. Jac. Oesh. lib. obs. propr. An. Hafn. v. 1. 1. obs. 156.

‡ Bonet, sepulch. anat. lib. 3. § 30. obs. 30

of a hernia suffice for making us distinguish this case.

The prognoses of herniæ depend on so many circumstances of the patients and of the symptoms, that I chuse rather to pass them altogether, than to enter upon the numerous suppositions which might be made.

That herniæ should be reduced as soon as possible, all agree; to effectuate this, without cutting or eroding is what surgeons call the *taxis*: For this purpose such a posture of the patient's body as makes the viscera press on the rings of the abdominal muscles, and relaxes the skin and muscles most, is of great advantage; such is lying on the back, with the hips and shoulders raised higher than the loins, and the thighs bended forwards without using any effort of the muscles: While the patient lies thus, the surgeon gently pushes the viscera up with his fingers alternately applied to a small part of them at once, as is commonly described well enough; and therefore I shall not here transcribe the directions for doing this operation; but must observe, that sometimes, after the bowels seem to be pushed up into the abdomen, a soft knotty substance remains unreduced, and resists all the efforts to reduction, till the patient's vessels are emptied by venesection, repeated purgatives, and low diet. The varicous feel this substance had, in the cases I saw, made me judge it to be the mesentery with its vessels distended.

If this attempt does not succeed, general directions are given for removing the impediment to reduction by plentiful bleeding, emollient clysters, fomentations, and poultices. As all these are calculated for the inflamed state of herniæ,

they do very ill, in my opinion, who prescribe no other method; for though herniæ, especially recent ones, that will not reduce, are liable to inflame and strangulate, which very soon brings the patient into danger of his life, and therefore surgeons ought to be much on the watch to guard against inflammation; yet an over care to prevent it, ought not to make them do things that may retard the reduction, or make it more difficult, since it is the most effectual preservative against all the bad symptoms. The directions mentioned above, and almost universally ordered and put in practice, are, I think, in this respect, faulty: If, for example, the obstacle to reduction is the rarified air within the guts distending them, would not the warm relaxing fomentes and cataplasms increase the distension? Since the first edition of this volume, I have seen a case of a hernia related by Dr Huxham\*, who blames the repeated application of hot fomentations for the vast expansion of the bowels. I have seen cold claret or snow make the distended intestines return into the belly after the antiphlogistics, as they are called, had increased the swelling, and the common efforts of reduction had failed.— In the same way, when the tone and contraction of the guts is too weak for pushing the ingesta, which descend into the part of the gut engaged in the hernia, upwards, to go forwards towards the anus, and thereby these ingesta come to be collected in the hernia, and to make the intestine there too bulky for passing the ring of the abdominal muscles, bleeding and relaxing medicines will weaken the tone of the guts more, and so increase the disease; a brisk stimulus given by the

\*Philos. Transact. Numb. 459. § 22.

the mouth or anus, would much more effectually make a cure. I have many times made a rupture reduce by giving powder of the jallap root and sweet mercury, when neither hands nor emollients did any good.—Will not the soft flabby omentum, if it is lodged in the hernia, be always more relaxed, and swell more by the application of emollients? What I would recommend then is to examine accurately the circumstances of the disease, and to vary the method of cure according to the nature of the obstacle to reduction, whether it is air, fœces, increased growth of parts, or overstretched inflamed vessels, which last only admits the use of the things that are prescribed as proper in all cases; and, even in it, caution is necessary in using those medicines.—If a person is old and weak, the loss of too much blood may sink him, and make the liquors stagnate in the distended vessels, to bring speedily a mortification.—If the patient is of a very lax constitution, bleeding to excess and the application of emollients may weaken the vessels so as to make them continue in their distended state.

If the viscera will not reduce by the methods hitherto proposed, and the symptoms of strangulation come on, there is a necessity of performing the operation for the bubonocœle or complete hernia; the rules for which, laid down by late writers, are well enough accommodated to the most ordinary circumstances of herniæ; though, it is plain, that, as these are various, operators must sometimes change their manner of working. I shall not therefore give you the trouble of reading a description of the operation for the hernia in

the groin or scrotum, but shall make some remarks on parts of the operation where there is doubt what ought to be done, and on some of the more uncommon cases.

When the viscera are not confined within a sac, which I observed was sometimes the case, more than ordinary care is to be taken in making the incision through the teguments, lest the bowels should be wounded.

When the sac is laid bare, it ought to be considered, whether it is to be left entire, and pushed up into the rings after the bowels are reduced, or if it should then be laid open. Circumstances must determine this; if the disease is recent, with the sac thin and not folded into wrinkles, or straitened where it is coming through the passages in the muscles, or grown to any other part; if the bowels are sound and in no danger of gangrene, or are not grown to the sac; if the liquor in the sac is limpid, and no fæcor or erosion is to be observed; if all these circumstances appear, the reduction of the sac entire will be of service to block up the passage, and to prevent the viscera from being exposed to the action of the external air.——Where these circumstances don't meet, the sac ought to be opened, for very obvious reasons; the wrinkled or contracted sac may continue the strangulation after the ring of the muscle has been cut †, the sac or bowels fixed by concretion will not reduce; an opened gut will let out the ingesta, and a mortified omentum will slough off into the abdomen,

† Le Dran, observ. 59.

men, from which there is no exit; and stagnating there, they will corrupt more, and do great mischief. The same effect may be expected from the liquor in the sac, if already acrid.

If there is a considerable concretion of the bowels to the sac, and this is grown to the scrotum, the surgeon had better leave the bowels as ~~reduced~~ after cutting the strangulating ring, than risk the life of his patient by a tedious dissection of the concreted parts, especially if the guts or bladder are the parts grown to the sac; for, when the strangulation is removed, the viscera may possibly ~~move~~ <sup>move</sup> up, or if they continue down, a cicatrice may be brought over them, in which condition the patient may live a considerable time.

When, in such a concreted state of the bowels, the strangulation depends on some piece of a gut lately fallen down, this should be reduced while the other parts of the bowels are left down\*.

Tho' the gut in a hernia is mortified, surgeons ought not to give over the care of their patient, since there are several instances of such people surviving with either an artificial anus at the ring †, or nature has reunited the distant pieces ‡, or she has been assisted by art to join them §. Mr De la Peyronie's method of stitching the parts of the mesentery belonging

\* Morand. in de la Fay's notes sur Dionis, p. 55.

† Mery, memoires de l'acad. des sciences, 1701. Chesden's anatomy, p. m. 69. Le Dran, obs. 60.

‡ Courtal. obs. 6. Medical Essays, vol. i. art. 20.

§ De la Peyronie mercur. de France, Juillet, 1732. Ramphrius commerc. Norimberg. 1731. Spec. 26.

longing to the two ends of the divided gut, seems preferable to Ramdohrius's practice of stitching the gut itself, for this irritates more, and the threads of the stitch will not come away so easily, and more readily leave an opening in the gut, than when the stitch is made in the mesentery.

Though nothing appears in sight when the sac is opened except the omentum, the surgeon ought to examine carefully, whether any ply of the intestine is wrapped up within the caul, that they may be disengaged from each other, lest the gut be cut or tied, if there is occasion to perform any such operation on the omentum.

If the omentum is not absolutely mortified, it should have the chance of recovering by being reduced, since at worst no more inconvenience will happen from the separation of what nature mortifies, than what the ligature, which must be made on the present supposition, occasions.

It is a doubt with me, whether the omentum ought to be tied before the mortified part of it is cut off; for by the ligature more of it is destroyed than would be if the gangrened part separated of itself, because the ligature is made in the sound part, and by the thread the omentum is drawn into a knot, which may do hurt. Supposing the mortified part to be cut off as near to the sound part as the thread in a ligature is put from the place where the caul is to be cut off, would the cut vessels in the remaining mortified part bleed? or would the gangrene more readily spread without a ligature.

sure than with it? The answer to these two questions (which I neither have experience, nor can I find any observations of others to assist me to answer) would determine what the practice should be. Since what is above was published, I have read two cases \*, where there was no hæmorrhagy, nor further progress of a gangrene, after cutting away a considerable share of the omentum on which no ligature had been put.

After the hernial sac is emptied by the reduction of the bowels, a membranous substance will sometimes appear resembling a piece of gut †, which is no more than a folding or doubling of the sac, and ought to be let alone, without fatiguing the patient with the dissection of it.

After the bowels are reduced in appearance, the surgeon ought to search with his finger, lest there be any contracted ringlet, cross bars, or productions of the peritonæum above the ring in the muscle, which might continue the strangulation of the gut, that they may be cut to make the gut quite free ‡. Such strangulating rings are most readily to be met with in people who have long wore trusses, which have pressed the sides of the neck of the sac together.

When the intestine is opened, or there is gangrene or inflammation on it, that may give reason to expect it will be opened, when the

\* Philos. transact. numb. 443. sect. 8. and numb. 450. sect. 2.

† Mery, mémoires de l'Acad des sciences, 1701.

‡ Le Dran, observ. 58.

the suppuration comes on after the reduction of a hernia, or if it is expected that any part of the omentum will separate, the peritonæum and ring of the muscle ought to be kept open, to allow the putrid matter to be evacuated; but the substance introduced into the passage ought neither to be so hard as to bruise or irritate, nor so large as to hinder liquors to drill along it, lest an inflammation be raised, and the pus, feces, or aliment be pent up within the abdomen, to the ruin of the patient.——But when there is no reason to expect the effusion of any such putrid substances into the abdomen, the sooner we can shut it up the better. If we could raise up the hernial sac from the spermatic cord with little trouble, and then put a ligature round it close by the ring of the muscle, it would shut up the passage most effectually during the cure, and might be a means of security against a relapse.

It may be said in general, that the *antiphlogistic regimen* is to be observed after this operation; but regard must be had to the constitution of the patient, and circumstances of the disease in prescribing it, for these will sometimes oblige practisers to alter the common method.

When the gut has been opened or divided, the patient needs to guard against too full meals for a considerable time after, or for all his life, if the gut has been divided quite cross, to prevent the bad effects which the pressure of a large quantity of food stopping at this part of the gut, which is generally straitened, might produce.

After the viscera of a hernia have been reduced, the passage in the abdominal muscles, by which they escaped, must be straitened or blocked up, to prevent a relapse. While this is doing, the viscera must be hindered to come out by the patient lying horizontally on his back with his hips a little raised, and by a proper bandage.

The dilated parts have sometimes been so strengthened by the application of astringent medicines as to keep the bowels up \*; generally however they are insufficient for the purpose.

By pressure continued long, the sides of the peritonæum have been made to grow together †; but, unless the ring of the muscle make a sufficient resistance, the peritonæum thus folded will not do it.

If the passage is kept a long time from being dilated, the sides of it gradually contract themselves, and become firmer, to hinder the falling down of the bowels; for this purpose different bandages have been contrived.

The spica bandage, with proper compresses, answers the purpose very well, and is always used where there is wound or ulcer, because it can be easily cleaned; but to people, who are to wear the bandage long, and in the mean time are to be out of bed and to move, without any sore to dirty the bandage, the spica is inconvenient by the trouble there is in applying and undoing it, and by the turns of it fre-

\* Medical Essays, vol. 2. art. 28.

† Le Drac, observ. 65.

frequently sliding out of their place; wherefore to such, a compound bandage is generally applied.

The bolsters of most compound bandages or trusses are much too soft, they can yield as much as to allow the viscera to come out, when the patient makes any strong effort that pushes the bowels upon the bolster; they should be very hard stuffed, or made of cork or some such substance, with leather stretched over it.——

The shape of these bolsters is generally too very faulty; the convexity to be applied to the skin is either equal from the superior broad part to the inferior narrow point, or very gradually diminishes all the way, by which the point being applied upon the *os pubis*, the part of the bolster above it is borne off from the skin, and a hollow is left just at the ring of the muscle to allow the bowels to come out, especially when, by bending the body, the upper end of the bolster is also forced outwards. They ought to be made with such a sudden failure of the convexity, that they may fit close to the hollow immediately above the *os pubis*. See such a bolster represented Tab. v. fig. 8. or they ought to be made thicker below than above, applying the thickest part immediately above the *os pubis*.

The compound bandages which are made for children, without any steel or other firm substance on the outer surface of the bolster, can have very little pressure on the rings, as they are commonly applied, with the circular belt sewed to each side of the bolster, for their convexity soon becomes all external by their appl.

application; whereas, if the circular belt was brought cross over their external surface, the full effect of the pressure might be had on the rings of the muscle. To bring the circular belt thus cross the bolster, the belt must be put lower down than it is commonly applied.

If a right-made bandage, that prevents the falling out of the bowels, is kept applied several years to children, the peritonæum and ring may become so firm, and the viscera may grow so large, that the rupture may not afterwards return; but, if the bandage in children allows the viscera to come out sometimes, and, in adults, where the stretched peritonæum and dilated ring cannot so well recover their former state, and the bowels do not grow larger, there is always danger of a relapse, if a constant pressure is not kept on the ring, at least when the person is in an erect posture; nay, I have observed, that most of those who wore a bandage for this disease when children, suffered a relapse, if they laid aside the bandage when they grew up.

Formerly several different operations were practised for blocking up the passage by which the bowels fall out, after they were reduced. The castration, *punctum aureum*, and cauterizing, were laid aside after trusses came to be tolerably made, till some years ago the cautery was revived here in Britain with great eclat, notwithstanding its being practised by those who were altogether ignorant of the nature of the disease, and of any reasonable intentions of cure. By their promising more for its success than could be performed by it, to wit, a compleat and absolute security

against any return of the disease, whereas it failed in most or all adults it was practised on †, and by the many blunders those ignorants committed, the reputation of this operation sunk in a little time so much, that it is now neglected, though it would seem capable of being performed safely, and with some advantage.

What could be reasonably proposed by this method is, after reducing the hernia, to destroy the skin and fat covering the ring of the external oblique abdominal muscle, and to make new flesh rise round the spermatic cord in the ring itself; by this new flesh the ring may be blocked up, and by bringing a firm cicatrix immediately over the ring, instead of the flexible *tunica adiposa* and skin, a sort of bolster might be formed for resisting the viscera when they were pushed outwards.

The late operators applied for this purpose a caustic to the skin, without having, so far as I could ever learn, any rule to know when it had eroded deep enough. If their eschar was too superficial, the design of the operation could not be answered; if the caustic eroded too deep, the spermatic vessels would be destroyed. I have been assured that, after this operation was performed, the testicles of some children, who had undergone it, shriveled daily away, so that they were effectually castrated. When the caustic penetrated so far as the fibres of the cremaster muscle, would not the testicle be drawn convulsively up towards the ring of the oblique muscle? and would

† See Houston's History of Ruptures.

would not a contrary caustic immediately stop the further action of the one first applied? Tho' it is reasonable to answer both these queries in the affirmative; yet, never having made the trial of the caustic in this way, I shall desire none to practise it, since they can do what I mentioned to be intended, without any risk, by pinching up the teguments which lie over the ring, and then making a longitudinal incision some inches in length, the middle of which ought to be over the ring, the depth of it such as to bring the spermatic cord in view; then by the lunar caustic, small quantities of the common caustic, or other escharotics rightly applied, destroy the fatty cellular membranes in the ring and under the skin; after which hasten a cicatrice by the application of ardent spirits, or tinctures made with them; and by this endeavour to make the cicatrice adhere to the tendon in the way cicatrices generally do to bones, part of which has cast off where there has been any ulcer of long standing near them. By lying a-bed to prevent the viscera coming out during the time of the cure, which allows the ring of the muscle to contract, and by the cicatrice, I have seen patients walk afterwards without the bowels falling out, though they wore no bandage; but this cure is not to be depended on; for, though the new flesh, which sprouts out from cellular substance suppurating, appears at first firm, yet it afterwards becomes as mere cellular membranes as any where else; as every surgeon must have seen who has had occasion to examine a wound or incision made where a wound or ulcer

cer formerly was ; and though the cicatrice adheres firmly at first to the tendon ; yet it gradually becomes more loose, and is itself more capable of stretching, and therefore yields to the viscera pushing it with violence, as it did in one of the boys whom I saw very carefully treated in this way ; so that I would advise no body to throw away the bandage after they had undergone the cauterizing, otherwise they run an imminent risk of the hernia returning. This method does no more than make the persons who undergo it less exposed to the falling out of the viscera, if their bandage should at any time shuffe, or be borne up off the rings.

The last method I shall mention for blocking up the rings, is by the operation of the bubonocoele, concerning which I made some remarks already. This has generally been thought to prove an absolute cure ; but, for the reasons given against the cautery proving such a cure, I join with Dr De la Faye \* in opinion, that it is the safest course to wear a bandage likewise after this grand operation. And Mr. Myand tells us †, that he has seen three or four instances of herniæ returning after this operation ; and therefore concludes, that it is only a palliative cure.

XXII. of

\* Notes sur Dionis. p. 61.

† Philos. Transact. Numb. 443 § 3.

XXII. *Of the Tumors in the Scrotum, commonly called false Herniæ; by the same.*

**S**URGEONS generally give the name of false herniæ to the tumors in the scrotum, occasioned by any other cause than the falling down of the viscera into it; and as these false herniæ begin below, and rise upwards, whereas the true herniæ must begin above, and descend afterwards, a pretty sure sign is thence taken, by which the true herniæ may be distinguished from the false.

Because these false herniæ are of different natures, and contain different substances, they are distinguished into several classes, of some of which again there are different species, according to the particular seat or nature of the tumor.

To fulfil the promise I made towards the end of the paper I sent you on the anatomy of the scrotum, I have wrote the following remarks on each of these false herniæ, without pretending to give a full and complete account of them, but with the view to put surgeons on observing more, exactly the diseases they treat.

### Of the HYDROCELE.

When water forms a tumor any where within the scrotum, the disease is called hydrocele; of which there may be reckoned several different kinds, according to the different part the water is lodged in.

1. When water diffuses itself in the cellular sub-

substance of the scrotum, the disease has the same appearances as anasarca or leucophlegmatic swellings in other parts of the body; allowance only being made for the looser cellular substance without any fat in the scrotum than elsewhere.

The causes of this scrotal anasarca are very different; one of the most common is a more general anasarca spreading from the thighs to the scrotum. Any tumor pressing the vein of the scrotum produces a hydrocele of this kind, in the same way as dropsies are caused in other parts by a ligature or pressure applied to their veins. Thus a tight garter makes the foot and leg to swell; thus the legs of women with child are often very oedematous; thus the monstrous swellings are caused, which sometimes happen to the arm when a schirrus in the arm pit becomes large, &c. For this reason it is that often in the true hernia, and frequently in the false ones, when the tumor rises high, the scrotum becomes very thick. One cause more which I shall mention, is the stoppage of the urine by a stone, excrescence, or stricture in the urethra, when the urine bursts through this canal, and diffuses itself into all the cellular substances of the scrotum, penis, and neighbouring parts.

The symptoms of this kind of hydrocele are common to any other oedematous or watery swelling, and are well enough known by all surgeons.

In the cure, particular regard is to be had to the cause; for, unless that is removed, no cure can be expected. The more general anasarca

farca is to be cured; the hernial tumor is to be removed; the stone, excrescence, or stricture, is to be taken away. And then, in the oedema of the scrotum, depending on the two former causes, the common methods are to be put in practice. But, when urine is diffused in the cellular substance, we need make no attempt to cure it by corroborants, hydragogues, &c. for the urine soon corrupts, either is not absorbed or re-assumed into the blood from the cells, or, if it could be taken up, it would produce a general disorder in the body, and would leave enough of its grosser acrid parts to raise inflammation and all its consequences, abscesses, gangrenes, &c. The most speedy and safe method of cure in the case of a hydrocele from diffused urine, is soon to make numerous deep scarifications, and to bring the wounds to suppuration as fast as we can, otherwise we may lay our account that at least several abscesses will be formed, after which there will be numerous callous sinuous ulcers to cure, of which I have seen several examples.

2. A watery liquor may be poured into the cellular substance of the spermatic cord, as well as into the cells of the scrotum, and is occasioned by like causes. If the cellular substance behind the peritonæum becomes oedematous, the watery liquor will drill down into the spermatic cord; if the spermatic or scrotal veins, but especially the spermatic, are compressed, or if any other way the return of the blood from the testicle is impeded, this species of hydrocele is formed. It is therefore often to be observed in those who have an universal oedema,

oedema, in people whose abdomen is violently stretched by a hydrops ascites, distended liver, or any other tumor in the belly, and in such as have the true or false herniæ.

The symptoms of this disease are an oblong soft tumor in the spermatic cord, which by continuing pressure on it some time may be diminished or made to disappear, the water being gradually squeezed up into the cells behind the peritonæum; by changing the patient's posture, its figure changes; lying horizontally with the scrotum supported, it becomes more oblong, and of near equal dimensions from the rings to the upper part of the testicle; by standing erect with the scrotum pendulous, it becomes larger in the lower part, and smaller at the upper.

Generally, when the cause of this swelling is removed, the tumor disappears; if it does continue, the same indications of cure are to be pursued as in the former species, depending on the two first causes I there mentioned, which are similar to the causes of this.

3. Most incysted tumors are no more than a cellule of the *membrana adiposa* distended by a liquor stagnating in it; and therefore we may expect that sometimes a cell or two of the spermatic cord may be formed into hydatides, which have been taken notice of by Albucasis †, and one or two late writers in surgery, as a species of the hydrocele.

The figure of this tumor is oblong, the cyst being confined by the cremaster muscle, the firm

† Chirurg. part. 2. 62.

firm cyst and fluctuating liquor are felt, and the testicle is situated below it.

The general methods of cure are nearly the same as are directed in the collection of water between the *tunica vaginalis* and *albuginea* of the testicle, which is the kind of hydrocele most commonly described. Though tapping is the palliative, and opening the sac is the radical cure here; yet it is to be observed, and indeed is plain from the seat of the tumor in this species of hydrocele, that neither trocar, caustic, nor knife, are to be applied at the bottom of the scrotum, as is done in the common hydrocele; because, if the operation was done at this place, the body of the testicle must be pierced through before any water could be evacuated: The external side of the scrotum is the most convenient part for making the opening in this case, shunning, if we can, the distended veins of the scrotum.——When there are two separate distinct watery cysts here, as it is said there have been\*, one remains distended, when the other is evacuated by an operation, and the operation must be repeated or continued to open the second.

The following history of a case of this species of hydrocele, where both disease and practice were not in the common way, may not be impertinently joined to an account of a disease concerning which you will find very few observations.

One who had formerly been compleatly cured of the common hydrocele, or water between  
tween

tween the coats of the testicle, by opening the whole sac, having in the evening made a cherry at a bottle, was seized in the night time with pain and swelling in the scrotum, which being attended with a quickness of the pulse, was believed to be of the inflammatory kind, and for several days he was treated with a view to the inflammation; he was several times bled, antiphlogistic purgatives were given, he was kept on a low cooling diet, and emollient fomentations and cataplasms were applied. The scrotum swelled greatly, the skin of it became red, and a tumor within it rose as high up on the left side as the ring of the external oblique abdominal muscle. At last a fluctuation was felt in the parts where the teguments were thinnest and most flexible. A trocar, the cannula of which was open in one side, was thrust into one of these parts, and, upon withdrawing the stile, clear water rushed out. The surgeon had introduced the trocar so perpendicularly, and the teguments were so rigid, that, notwithstanding the advantage of a scoop-handle which the cannula had, he could not turn it so oblique as to make use of it as a director to run a bistoury upon for opening the sac as he intended. In this attempt most of the water was evacuated; the patient was therefore allowed to recruit his strength some time, in which the sac filled again. Then a large train of common caustic was laid upon near the whole length of the scrotum towards the outside; and immediately after the caustic had had a sufficient operation, an incision was made through the tegu

teguments two inches thick into the sac about the middle of the tumor, and a finger being introduced into the opening, one of the blades of a pair of scissars was carried upon it, by which the sac was opened first upwards to the ring of the muscle, then downwards to the septum immediately above the testicle. What the quantity of water evacuated was, could not be exactly known, most of it being spilt on the floor by accident, but it was considerable. The wound bled pretty briskly at first, but the hæmorrhagy stopped soon after the cavity and wound were filled with *charpie brute*, unformed lint; the scrotum was covered with compresses, and supported by a suspensory bandage.

There being no bad appearance of any kind, the dressings were not removed for three days, when the beginning suppuration and ouzing water had made them wet. At the second dressing the sac feeling of a callous hardness, and there being a considerable thickness between it and the spermatic vessels, the dossils to be put contiguous to it were wet with spittle, and then rolled in fine powder of red precipitate mercury; the eschar made on the teguments by the caustic having suppurating ointments applied to it.

When the eschar came off, the fore of the scrotum had a scirrhus appearance both in its hardness and unequal surface; however, seeing the caustic in this first application had no bad effect, it was resolved to waste the scrotum with it; for which purpose pledgits wet in  
spittle

spittle were pressed on the powder of common caustic, and applied to it.

The precipitate was continued to be applied daily to the sac till it became soft, granulating flesh rising every where, and laudable good proceeding from it. The caustic was renewed to the scrotum as often as the eschar of the former application fell off, till it became near of a natural size and firmness.

The sac was then allowed to heal, which it did very soon. Except a small equal scar nothing is now to be observed on the scrotum, and the patient has been several years, since the cure, without the least symptom of hydrocele.

4. The collection of water between the vaginal and proper coats of the testicle, is so well described, and the directions for treating it are so full in the common books of surgery, that I need not enter into any particular detail of it. It may not, however, be amiss to observe, that when tapping is to be performed for relief of this disease, the skin of the scrotum ought to be stretched very tense where it is to be pierced; and the tumor is to be made very oblong by the surgeon, that the instrument may penetrate easily, which it will not do when the skin is lax, and that there may be sufficient space between the lower part of the sac, where the perforation is to be made, and the testicle, to prevent any injury being done to the testicle by the point of the instrument.

When the quantity of water in this hydrocele is small, I think the lancet a safer instrument for making a perforation into the sac with

with than the trocar, which always requires a push that makes the teguments and sac yield so far, that the point of the stilet comes too near the testicle, before the cannula is forced through.

Considering how readily contiguous inflamed parts grow together, and how many instances there are of people having a radical cure made of this hydrocele by inflammations coming on the parts, it would seem no unreasonable practice to endeavour, a concretion of the two coats of the testicle when they are brought contiguous, after letting out the water through, the cannula of a trocar, by artfully raising a sufficient degree of inflammation. This, to be sure, must be done cautiously, and so that the surgeon can reasonably expect to be master of the inflammation; and therefore the application of all irritating medicines, the operation of which he could not immediately stop, or any single mechanical effort, the effect of which he could not be sure of, are not to be employed. Suppose the cannula of the trocar was to be left in, by the extremity of it rubbing on the testicle, an inflammation might be gradually raised, the cause of which could be taken away as soon as the surgeon thought fit. I have never seen this practice attempted, and therefore you see I mention it diffidently.

The following case of a sac in the spermatic cord, cured in this way, may, however, encourage us to expect success also where the water is contained within the vaginal coat of the testicle:

A man who had had the *paracentesis* several times, performed for the evacuation of water

lodged between the vaginal and proper coat of the right testicle, received a violent bruise on the distended scrotum, by his horse stumbling. The pain and inflammation occasioned by this bruise confined him to bed some time, till they were removed by evacuations, fomentes, &c. as in common inflammatory cases. The hydrocele was no more observed after these symptoms went off.

Some years after, a hydrocele of the third kind here mentioned, viz. a collection of water found in a sac of the spermatic cord of the same side where the former hydrocele had been, was plainly felt. An incision about an inch long was made into the side of the scrotum, by which near a pound of water was let out. A pipe, four inches long, of the shape and diameter of a female hollow catheter, with a smooth shut extremity, and openings in the sides, as that catheter commonly has, but with a plate fixed at the other end, to serve as shoulders which should hinder it to slide all into the cavity where the water had been lodged, was introduced and allowed to remain two days.—By this irritation so violent an inflammation was brought on, as would not resolve, but suppurated, and from it a very great discharge of pus was made. After the inflammatory symptoms were well off, the silver pipe was employed as a tent introduced into the cavity, being taken out every day to be cleaned, and again introduced, till the cavity filling up from the bottom, would no more admit it; and soon after the sore was compleatly cured, without the least return of any kind of hydrocele afterwards.

In this, and the case formerly related of this kind of hydrocele, and in two other such cases,

I put my finger into the sac, and felt what is called the *septum*, between the spermatic cord and testicle, § 21. with the epididymis, but could not touch the body of the testicle.

In opening the whole sac for making a radical cure of the hydrocele, where the water is collected between the vaginal and proper coat of the testicle, I would prefer the application of a caustic along the tumor to destroy the skin, previous to an incision into the sac; for by the caustic, one has a larger opening of the teguments than by any incision; and a large enough external orifice is always to be preferred in a hollow ulcer, which this must become, to a confined orifice, which puts the patient and surgeon both to the uneasiness of keeping it always open enough, and runs the risk of making a sinuous ulcer after all. This is more especially necessary where a membranous bag is opened, and afterwards to be filled with new flesh; for such membranes are longer in coming to suppuration, and in sending out granulated flesh, than other parts are. The time which the eschar takes in casting off, especially when the surgeon applies spirituous medicines to prevent its separation; this time, I say, wherein the orifice of the fore cannot contract, compensates for the slower suppuration of the sac; and the inflammation that continues in the obstructed neighbouring vessels to the eschar is frequently, in lax habits or parts, of use to promote a right suppuration when it is needed.

When the sac is opened in the operation now described, the testicle generally starts out at the wound, where it is in danger of being injured; the surgeon ought therefore to take care to keep

it within the scrotum, I once saw the testicle left out of the scrotum after the operation for the hydrocele, till the granulated flesh rising from the coats of the testicle, formed a covering for it, without the patient having a bad symptom all the time of the cure.

I hope no body will believe that such rough treatment as I mentioned the sac of the spermatic cord to have undergone in the patient, whose history I have related lately, is ever to be given to the testicle when its *tunica vaginalis* is opened: The testicle will not bear such irritation, as may appear from the following history. The watery discharge continuing, and no granulated flesh rising, two weeks after the operation for this species of hydrocele had been performed, the patient put waxed thread twisted into the sac, then slept some hours, and awaked with sharp pain in the testicle, which soon brought such a smart fever as required four plentiful bleedings before it went off; but being succeeded by a mild suppuration, and granulated flesh rising from the sides of the cavity, a complete cure was soon made.

Though the inflammation and fever are for ordinary strong, when the testicle is irritated; yet the patient generally must undergo them, before a complete cure can be made of this most common kind of hydrocele; for the ouzing of water into the sac continues till the inflammation causes some suppuration on the surface of the coats of the testicle.

I cannot conclude my remarks on this hydrocele, without mentioning a case which I don't remember to have seen described. A young man, who

who never had any symptom of a true hernia, had the vaginal coat of the testicle laid open to cure a hydrocele. After the water was discharged, a soft fat substance, resembling a piece of the omentum, presented itself at the wound. It was gently drawn out and stretched, and no vessels appearing in it, as much of it as the surgeon could come at with his scissars was cut away. The ring of the abdominal muscles and the spermatic cord were of the natural size. No sharp fever or inflammation were raised, but the scrotum became very thick, and of a scirrhus hardness, which was removed by a poultice of hemlock, and repeated doses of mercurial purgatives, and a compleat cure was made.

All these four species of hydrocele described above are sometimes seen together, of which the following history may serve as a good enough example:

An old, but otherwise healthy man, had a hydrocele of the third species in the left side, without any manifest cause that he could remember, which became so large and weighty as required an evacuation: He would not allow the sac to be all laid open, but was tapped with a trocar, pushed into the external side of the scrotum, by which more than a pound of water was evacuated; then the thickness and softness of the spermatic cord discovered the oedematous swellings of its other cells. Some months after he observed the sac filling again, which it continued to do till it was as full as formerly. He delayed having any thing done to it near two years, when all the scrotum, but particularly the left side, was greatly swelled; the teguments were very thick

and firm, a fluctuation of liquor, however, is perceived not only at the superior external part, but at the inferior part where the testicle could not be felt as it had been formerly; and there was a cross depression appeared externally, which seemed to point out its being divided into two tumors; the alternate pressure of the finger on the lower part did not make any sensible fluctuation in the superior part of the scrotum: The case was therefore judged to be a complication of three species of hydrocele, and that probably the fourth, viz. the thickning of the spermatic cord, which had been felt in his former illness, would be discovered afterwards; the teguments were thinnest, and the fluctuation was best felt at the bottom of the scrotum, for which reason the trocar was first put in there, but with some difficulty; and several ounces of water being evacuated, the patient desired any further operation might be delayed. He went abroad some days, then became feverish, with sharp pain towards the lower part of the tumor: He asked no advice for some days more; in which time, an evident inflammatory tumor had increased considerably, and the common symptoms of suppuration were begun, which the usual medicines advanced very quickly.

When the abscess was fully ripe, it was laid open by incision, about twelve ounces of pus were let out, and the cavity in which it had been lodged was plainly seen to be formed in the substance of the swelled testicle.—The ulcer was treated in the common way, and promised to cure quickly, the cavity and remainder of the testicle diminishing daily; but the fluctuating  
tumor

tumor in the upper part of the scrotum continued tense, but fluctuating when pressed. — Ten days after opening the abscess, the dressings were observed to be much more wet than ordinary; and when they were taken away, clear water dropt very fast out, and the superior tumor appeared considerably subsided. This watery discharge continuing, the superior swelling went off, and then the ulcer cured; the patient recovered perfectly, and had no more hydrocele.

I have often seen children that were born with a complication of hydroceles, particularly of the first and second species, or who were seized with them soon after birth. They are very easily cured with any corroborants; a bit of flannel, warmed with the fumes of burning benzoin, cures them in a few days.

5. I formerly remarked, that a liquor is frequently found with the viscera in a true hernia, which may be looked upon as a fifth kind of hydrocele; when the quantity of this liquor is small, it is neither in hazard of leading us into a fatal mistake of imagining the disease to be only a hydrocele of any of the preceeding species, nor does it require any particular method of cure; but, when the water is in large quantity with the viscera, we had need to be careful not to be imposed upon; otherwise in curing what we think a simple hydrocele, we may wound the bowels that are in the bag with it.

This kind of hydrocele may be distinguished from the third species, with which it is in most danger of being confounded, by a hernia always preceeding it, and by its generally yielding or diminishing

diminishing when pressed upon, the water in most cases being thus squeezed up into the belly.

If the water in this case is in no great quantity, and without much acrimony, it may be pressed into the belly, from which the medicines proper in a slight hydrops ascites will assist to discharge it. When true herniæ can be reduced without any aperture in the teguments, there seldom is any more necessary; but when the viscera will not reduce thus, the water may either become so acrid, which most frequently happens when the viscera are strangulated, or it may be in such quantity that we do not chuse to trust its absorption from the belly; or the bowels may have blocked up the passage, so that it cannot be squeezed into the belly, while, by its weight, and stretching the parts containing it, it creates great uneasiness and pain to the patient, and is in danger of occasioning disorders in the neighbouring parts. These two last cases are to be seen in herniæ of long standing. All three require the liquor to be evacuated.

Unless when the operation for the true hernia is performed, this evacuation ought only to be made by a small puncture, lest the bowels be exposed and hurt by the air. Instead of directions for making the puncture, I shall relate the history of such a case.

An old man had long laboured under a true hernia, which had not been reduced of a great many years; the tumor became at last of a monstrous size, descending near to his knee, and of a proportional transverse diameter; he was confined to lie on his back, had very violent pain both in the tumor and his loins, which kept him almost

almost constantly awake; his flesh and strength were much wasted; in some places a plain fluctuation of liquor was perceived with the fingers, without any of the unequal solid substances felt every where else; neither the water nor solid substances could be pushed into the belly. The tumor being pressed so as to make one of those parts, where the fluctuation was most evident and the teguments were thinnest, as tense and prominent as possible, a trocar as small as a crow-quill was thrust very slowly through the teguments and cyst; whenever the bag was pierced, the stilet was taken out, and the cannula was pressed a little forward, through which six pounds of clear serous water ran out; then the convolutions of the intestines and the knotty parts of the omentum were plainly felt, but none of them would reduce. The patient was greatly relieved of his pain, and had no symptom of strangulation of the bowels. No further operation was thought proper, he was allowed to enjoy the happiness he seemed to have by the removal of the violent pain during the short time he had to live.

6. I mentioned observations of Saviard and Le Dran of the hernial sac of the peritonæum remaining unreduced after the bowels were put into their place, the superior part of which being pressed by a truss was greatly straitened, or the sides of it were grown together, while the lower part was filled with water; this may be accounted a sixth species of hydrocele. I never saw this case, nor do I know how it could be distinguished from the third kind which I mentioned, unless the preceeding hernia led one to suspect its nature. There is one great happiness however, that, though

though surgeons should mistake one sort of the two hydroceles for the other, they could do no hurt, the method of curing both being the same.

To finish these remarks on hydroceles, it may not be amiss to give a general caution to all young practisers in the management of all parts that are made to subside or collapse greatly and suddenly after being violently stretched, especially if the tone of the solids of the patient, or of the diseased part has been greatly weakened, which is for ordinary the case in hydropic swellings. The caution I would give is, to imitate or supply the effect of the distending cause that is removed; otherwise they may expect that all the weak vessels which were formerly overstretched will be both incapable of preventing a larger quantity than their due proportion of fluids to be propelled into them, and as incapable of making it move fast enough forward; so that, unless when there is a free open out-let or passage for the liquors, the vessels are all over-distended with their liquors, which are in hazard of stagnating. In this way the lungs are affected when people die of a peripneumony or asthma, after a sudden discharge of liquor out of the thorax; thus the viscera of the abdomen are varicous and inflamed after tapping in the *hydrops ascites*; thus inflammations frequently seize the uterus after child bearing; thus the common teguments distended by water in the anasarca, or by pus in an abscess, become red, and sometimes mortify soon after a sudden discharge of the liquor which stretched them.— Moderate pressure will prevent the influx of the liquors, and distension of the vessels; gently stimulating and corroborant medicines will

with Tilt the vessels to recover their tone more quickly, which ought therefore to be made use of in such cases.

When in such a sudden subsiding or collapsing of an over-stretched part, there are vessels opening into any cavities, it may be expected that, for the reasons mentioned immediately above, the open orifices of the vessels will pour out their liquors in more than ordinary quantity, unless the influx of them is prevented by the means proposed in the former supposition; and these orifices are also pressed sufficiently to make them resist the momentum of the fluids stretching them. Thus violent flooding after delivery of a child, is sometimes moderated by pressure on the belly. Thus, when any large abscess is opened, pure pus runs out at first; then it becomes more and more mixed with blood, and at last pure blood is discharged, which sometimes runs out in a great stream, not from any one vessel, but collected from innumerable small pipes opening on every part of the surface of the ulcer; which haemorrhage stops soon after the cavity is filled with lint, and pressed by a bandage. Hence the necessity of keeping a constant pressure on a distended part, during, and after the evacuation of water in a dropsy, or of the pus of a large abscess in weak people. Hence watery tumors laid open send out more liquor in one day, than was collected in them for several months, while they were shut and stretched. Hence I imagine the haemorrhage has proceeded which Mr Jamison \* tells us happened to a patient of his after opening a hydrocele.

H A M A.

## HÆMATOCELE.

Blood extravasated after a bruise, wound, tumor, &c. into any of the parts where I mentioned water to be collected in the hydrocele, occasions a tumor which some call hæmatocele. Allowance only being made for the different consistence and colour of blood and water, what has been said of the hydrocele may serve also for this ecchymosis.

## PNEUMATOCELE.

*Pneuma*, spirit or air, was made use of by the antients to account for several phænomena of the animal oeconomy, and was esteemed the cause of several diseases; among these the *hydrops siccus* or tympanites, and the pneumatocele, or windy tumor of the scrotum, were as commonly described in books as the *hydrops ascites* or hydrocele; though the writings of observators shew those airy tumors to be very uncommon, and scarce ever to be found in the way they are for ordinary described.

Air, escaping out of the *trachea arteria* or lungs into the *tunica cellularis*, may diffuse itself every way, and among other parts may distend the cellular substance of the scrotum and spermatic cord \*.——Air blown through a pipe put into a hole made in the skin, will distend all the cellular

\* *Parry* n. anat. chirurg. Traité 2. chap. 28. *Littre* Hist. de l'Acad. des sciences 1713. *Mery* Ibid.

cellular substance of that part, as has been done sometimes to the scrotum \*.—When there is not sufficient action of the vessels or circulation of the liquors to blend intimately the different particles which enter into the composition of the blood, the particles of air which were restrained from running together, and exerting their expansile elastic power, separate from the other particles with which they were wrought up into the composition of the blood, and being collected, exert the common effects of air in any part they are contained in †, and, if they make their way to any part of the scrotum, may produce the pneumatocele. In a scuffle in this town, a man was wounded with a sword in the belly, about half way between the navel and *cartilago ensiformis*; part of the omentum came out of the wound, which was reduced soon after. The patient was exceeding faint, and his pulse very weak. He lived only twelve hours after the wound, in which time his scrotum became as large as his head, with the common signs of pneumatocele. When his body was examined by the surgeons who attended him, the abdomen was found full of extravasated blood, which had come from a wound of the *vena portarum*, through which the sword had pierced. Most of the veins and cellular substance of the abdomen, as well as the scrotum, were distended with air.—In some very putrid fevers, small-pox, and gangrenes, I have frequently

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\* Dionis operations de Chirurgie, demonstr. 4.

† Littere Memoires de l'Acad, des sciences, 1714.

quently felt some parts of the skin crackle like parchment under one's finger, and have heard a certain sibilus upon making incisions through it. When carcases begin to corrupt, air evidently begins to generate or separate in the vessels and cavities. From all which it is not unreasonable to conclude, that, in a very corrupted state of the fluids, the pneumatocele may be formed.

The symptoms of this kind of tumor are commonly described well enough.

When external air is introduced into the cells from the trachea or lungs, or by a pipe; after the access of more air is prevented, that already in the scrotum may be pressed out at incisions made through the skin into the cellular substance, while the bad consequences of the sudden collapsing of the stretched parts may be prevented by the application of corroborating medicines; and it may be convenient to keep up a suppuration in the incisions for some time after, for discharging any remains of the air.

When the pneumatocele depends on internal air, generated or separated from the fluids, the patient must be in very great danger; for such a corrupted state of the fluids, or such a weakened tone of the solids as is capable to produce this disease, is scarce to be remedied; and air collected in the vessels cannot well be discharged, and must terribly disturb, if not entirely stop the circulation.

The plentiful use of antiseptic and corroborant medicines are plainly indicated, while the scrotum is treated in the manner mentioned above,

when we supposed the pneumatocele to be formed by external air.

## V A R I C O C E L E.

Any large tumor in the abdomen, or external force pressing the veins, or any large tumor of the scrotum stretching the vessels, or impeding the return of the blood, may occasion the veins of the scrotum or the *corpus pampiniforme* to be greatly dilated with blood, which being only a symptomatic disorder, and going generally off when its cause is removed, needs no particular direction for its cure. But when, by the veins being long distended by such a cause, or if from any other cause the coats of the veins are so much weakened as to yield to their contained blood, and appear in the scrotum tumid and knotty, when the disease is named circocele; or when the *corpus pampiniforme* feels all composed of large knotty strings, which is the more common case, to which the name of *varicocele* is applied, there is a necessity of using some remedy; otherwise the stretching which the stagnating blood occasions, creates pain, the epididymis and testicle swell, and some species of the hydrocele is in danger of being formed.

A horizontal posture must be of the greatest service in this disease, by which the course of the returning blood is made much more free; whereas, in the erect posture, such a high gravitating column of blood as is in the spermatic veins, without valves to assist in its support, must have very great effect on the lower

er part of the vessels.—When the patient rises up, the scrotum, with its contents, ought to be well supported by a proper bandage, to prevent the stretching and pain which the weight of this pendulous part occasions. This precaution of sustaining the weight of weak tumefied pendulous parts, is altogether necessary, and is constantly to be done in all the different tumors of the scrotum.—If there is a general fulness in the vessels of a person labouring under the varicocele, they need to be a little emptied by the general evacuations, and topical astringents, and corroborants are to be applied for recovering the tone of the vessels.—If the varices here give much pain, and threaten to cause some other violent disorder, they may be opened and tied in the way commonly directed. I never saw any varicocele that required to be so treated.

## S P E R M A T O C E L E.

An excrescence or stricture at the *caput gal-  
linaginis* sometimes makes the *vas deferens*, *epi-  
dydimis*, and testicle itself to be greatly disten-  
ded with the secreted liquor contained in them ;  
this some writers call *spermatocele*, which is easi-  
ly distinguished from the varicocele, by these  
acquainted with the distended parts.

If this disease is recent, the removal of the ex-  
crescence or stricture cures it ; but, if it is allow-  
ed to continue any considerable time, it is in dan-  
ger of degenerating into a scirrhus or carcino-  
matous tumor, which has a different name given  
it, to wit, the *sarcocele*.

S A R C O -

## S A R C O C E L E.

The general cause of all the false herniæ of which I have hitherto treated, is a liquor distending the different parts in the scrotum. When the solid parts themselves seem to increase, or the fluids lose their fluid and put on a solid form, the name given to the disease is *sarcocoele*, under which several diseases may be comprehended; and therefore I am surprised that some, who have much fondness for the technical terms, have not applied a different name to each of them, phlegmonocoele, empyocoele, gangraenocoele, scirrhocoele, cancrocele, &c. would have made a fine string of pompous Greek words; and then each of these might have been distinguished according to the disease being in the scrotum, spermatic cord, or testicle. The distinction between phlegmonocoele and inflammatocele would have been just as proper as what is commonly made between circocoele and varicocoele. I am so far, however, from wishing to multiply the terms of art, that, on the contrary, if it was not for the danger of the students not understanding readily the books that have been wrote on this subject, I would propose to lay aside the distinction of true and false herniæ altogether, and would use none of the names of the false herniæ which prevailing custom has made me employ, but would call them by the common name the like disease would have in any other part of the body; so that I would have treated of the oedematous tumor of the scrotum or spermatic

spermatic cord; the incysted dropfy of the spermatic cord, coats of the testicle, or hernial sac; the suffusio of those parts; the varices of the scrotal or spermatic veins; the tumefied excretories of the testicle; the inflammation, suppuration, gangrene, scirrhus, cancer, &c. of the scrotum or testicles.

The different diseases comprehended under the name of *sarcocoele* have the same symptoms and require the same management as the like diseases do in other parts. Having no design to enter upon any account of so many different tumors, which ought rather to be done in a general treatise, than in such a confined essay, I shall relate the history of a mortification in the testicle which I think uncommon; then I shall make some remarks on the operation of castration, and shall conclude with another uncommon case, where the castration was performed.

A middle aged man, soon after recovering from a fever, during which considerable evacuations had been used, was seized with a very acute pain in the right testicle, attended with a quick pulse, for which he asked no advice for some days, during which the testicle, epididymis, and spermatic cord, swelled considerably; after this he was frequently let blood, emollient fomentes and poultices were applied to the part; he was purged with cooling laxative ptizans, and was kept under a strict low cooling diet, but without any relief, except what opium sometimes gave him. At length a fluctuation being felt on the testicle, a train of caustic was laid on the scrotum, and as soon as it

In its effect, an incision was made through the scrotum into the sac, where about two spoonfuls of thin pus was contained; the testicle being all in view, it appeared of that pale-white colour which it has in dead bodies.

Next day when the surgeon pressed the testicle, the patient was not sensible of its being touched, and the surgeon felt like a fluctuation under his finger; but, upon opening the *tunica albuginea*, no liquor appeared; the convoluted fibrous substance of the testicle started out in a very soft pappy condition, and putrid; a considerable quantity of this being cut away with a pair of scissars, the sore was dressed with warm basilicon, with which a few drops of *ol. terebinth.* were mixed, and a poultice of the farines, with some dissolved galbanum, was put over the whole tumor.

For several days after, more of that fibrous substance was cut off, till the bulk of what was brought thus away exceeded the ordinary size of the testicle in a sound man; the parts were well fomented, the suppuration was encouraged, granulated flesh sprouted out from the sides of the cavity in the testicle, the epididymis gradually diminished, the scrotum became thinner, and in short the cure went on successfully without any accident, till the sore was firmly cicatrized. One cannot now know which testicle was diseased, and the patient is sensible of no defect from it.

To perform the castration with the least trouble and dread of hæmorrhagy, pinch up the skin in the groin, and make a large longitudinal incision by which the spermatic cord may

may be brought in view; then take up the cord between the thumb and finger of one hand, so that the nails meet at the back part, upon which pass a very crooked needle with a thread; or rather use the aneurism needle with a handle, and the eye near the point, (See the figure of such a needle, tab. vi. fig. 5.); tie the cord as firm as you can with flat strong waxed thread; put two knots, without any compress, between them, and cut off the superfluous part of the thread with a pair of scissars; this being done, cut the scrotum down on the side next to the thigh, and, turning the edge of the skin outwards, slitch the large scrotal artery, after which the superfluous part of the scrotum, with the testicle in it, may be dissected away with very little loss of blood, only care must be taken not to hurt the other testicle, which will readily come in the way if the assistant surgeon do not be careful to hold it up in the groin during the operation.——The part of the spermatic cord below the ligature is not to be dissected away from its membranous adhesions, which secure the ligature from sliding afterwards.——By what I saw in four such operations there is no occasion for cutting the ring of the external oblique abdominal muscle; for there was not any retraction of the spermatic cord after the testicle was cut away in this way I have now described

The method above proposed of tying the spermatic vessels makes the operation of castration much easier than when it is performed as commonly directed; But, as the ligature round the cord

cord gives more pain than stitching the artery alone does, and the ligature prevents the efflux of any blood or matter that may be collected in the cellular substance surrounding the spermatic vessels, I now think what Mr Cheselden once did out of necessity † should be the constant practice. The spermatic artery ought to be stitched after castration, as other arteries commonly are after amputation. ——— The late Mr George Lauder being to perform castration where I was to be present, we concerted, that the ligature should be made with a single rose-slip knot, to stop the blood flowing from the spermatic artery, while he cut away the testicle, and stitched the scrotal vessels; then I loosened the slip knot; he stitched the spermatic artery with a needle and thread in the common way, but left the ligature loose in the wound to be ready for tying the spermatic cord, if any of its vessels had bled afterwards. No hæmorrhagy happened; he took out the ligature at the first dressing, and the wound cured very soon without the least bad symptom during the time of it.

Neither the common compound suspensory of the scrotum, nor a long swath are convenient bandages after this operation, for they do not apply neatly; a large compress broader considerably at one end than the other, with a round hole in the middle of the broad end of it for passing the penis through, and with a large cut in the middle of the narrow end of it, to allow the two parts to be folded over each other, ought to be applied over the unmade lint with which the wound is thick covered; and this is to be secured by the two ends.

† Anat. Book iv. Chap i.

ends of the T or sling-bandage, one coming on each side of the scrotum to be fixed to the circular belt, which ought to be double linen or fustian twilted, to prevent its wrinkling into a round cord, which galls the patient.

After the operation, the cure of the wound is the same as of any other common wound.

A young man mounting a horse struck the right testicle against the saddle; the pain of the blow was so sharp that he almost fainted, but becoming soon easier he neglected it several days, during which the testicle swelled considerably, and the pain increased; the tumor and pain were however soon put away by bleeding, purging, and low diet: He continued free of any uneasiness in the testicle several months, after which having rode post some days, the same testicle swelled, but without pain, which made him neglect to ask advice for a year and an half, and in the mean time he used much exercise, and lived in a full way. The testicle having then grown very large, he was prescribed pills made of quick silver and rosin of guaiac with a low diet, which he observed to excess, by which he had the addition of the low nervous symptoms to his other trouble. The bulk of the testicle still increasing, and a fluctuation of liquor being found at the lower part of it, a caustic was applied to the teguments there, and the eschar of it being cut through, some ounces of water ran out, but with very little decrease of the tumor: Soon after it increased considerably, and he spit some spoonfuls of blood; but as he had no cough, dyspnoea or pain in his breast, it was doubted whether the blood had come from his lungs or throat. Some

Some time after this he complained of a weight and pain in his loins in making a little journey in a chaise, the testicle became larger than a man could contain in his two hands, the lower and posterior parts were as hard as a stone to the touch, but in the superior anterior part a fluctuation of liquor was felt; there was no more space between this tumor and the belly than could allow a man's thumb to be pressed in between them, and in that place the spermatic cord was thick and hard; from the orifice formerly made by the caustic, fungous flesh stood out, which felt as if a liquor fluctuated below, but, upon a small lancet being pushed into it, no liquor was found; his pulse was weak and slow, without any symptom of hectic fever; he could take small quantities of broth and weak spoon food without uneasiness: But from a little while after he had made the sudden change of diet from full living to an excess of abstemiousness, his stomach could not bear fleshes or any solid food, so that at this time eating a leg of a chicken made him vomit. His case was judged to be very desperate, but that the only chance he had for life was the extirpation of this testicle, which operation he underwent with great courage and little loss of blood.

The *tunica vaginalis* was grown firmly to the *tunica albuginea* of the testicle at the lower part, but in the superior part was extended into a bag, which contained eight ounces of water; the body of the testicle itself was become a most compact firm scirrhus, with some few begun suppurations in it; it weighed near two pounds.

The patient passed the night after the operation calmly, but would not allow himself to sleep though

through fear of an haemorrhagy, the blood having ouzed through the dressings in the evening.

He was easy all the three following days, with rather too little fever, only complaining of a certain anxiety, oppression, and faintness which he scarce knew how to express, but affirmed it was such as made him sure he must die soon, though there was otherwise no bad symptom about him.

The dressings being removed on the fourth day, the lips of the wound were too little tumefied, and the suppuration scarce was begun; some cordial nervous medicines were given him from time to time, and he had syrup of poppies at night.

He was again dressed two days after, when the lips of the wound were rather too thick; the suppuration was begun, the pulse was slow and calm; the wound was well fomented and dressed with digestive.

Next day the swelling of the lips of the wound was fallen, but without a kindly plentiful suppuration; the prepuce and the skin of the penis had a watery thickness in them, and that uneasy sensation, which, as I said, he could not find words to express, was greater.

On the eighth day after the operation, the wound looked much better than it had done; his kidneys, his belly, answered well in their evacuation; there was no fault in his pulse; he took food, had no heat or thirst, nor any complaint, except that somewhat which he did not know how to express; and, though he called it weakness, yet he moved himself with such agility  
and

and strength, that he even joked himself for calling it by that name.

On the ninth day, in the morning, the watery swelling of the penis was decreased, the suppuration was more plentiful; at noon he eat some chicken, and drank a glass of wine; soon after he was seized with vomiting, then with coldness and fainting, which the strongest cordials did not put away; his pulse sunk and could not be felt long before seven in the evening, when he died. He remained sensible to the last, and spoke reasonably and with a strong voice till few minutes before his death, long after his pulse was gone, and his extremities were turned cold.

When his body was opened, the mesentery was found inflated with air to a prodigious bulk, as were all the other cellular parts of the abdomen; all the veins, large and small, were in the same condition; the auricles and ventricles of the heart were greatly distended, and collapsed with a great blast of air when cut. There was an ounce or two of pus in the cellular substance, near to the origin of the right spermatic vessels, but below that the cord was found, with the ligature firm on it, lying without the ring of the external oblique muscle. All the other bowels were very sound.

Though in considering the symptoms by which the several sorts of tumors in the scrotum are known, I have mentioned only those proper to each; yet I have here and there given hints that we are not to expect these diseases always single, but that there often are complications of them, which are to be discovered by the different symptoms belonging to each; for which reason,

and to save repetitions, I did not take notice of all the complications which might happen, and can easily be supposed by any who is acquainted with the structure of the parts, and knows any thing of the simple diseases.

The unwillingness people have to let it be known, that they laboured under the diseases of the parts I have treated of, made me relate the histories of particular patients without names, dates, or witnesses, so that the persons cannot be known, except by those who are already in the secret. When this paper is read in your society, I expect the different gentlemen who saw the cases I mention along with me, will bear testimony to the truth of what is told, for I have on purpose chused to relate only such where I had vouchers whom you could conveniently examine; so that your publication of these histories may be a warrant to the public, that the evidence of them is not supported by my single testimony while I don't transgress that part of Hippocrates's oath, which discharges us to reveal the secret diseases of our patients.

**XXIII.** *An impregnated Ovarium, and supernumerary Ribs and Vertebra; by Mr JOHN GEMMIL, Surgeon in Irvine.*

**A** Woman about 30 years of age, of a strong robust constitution, was hanged here on Thursday the 16th of January 1735, for the murder of her child. I was informed by a sure hand, that, on the first of January, she had her menstua, and have reason to suspect that she was

too intimate with some of her fellow prisoners. In dissecting her body, I found both the *tubæ Fallopianæ* greatly distended, the left one was pale coloured, but the right tuba appeared inflamed in its external coat. Having gently squeezed the left tube, a white body inclining to an oval figure, about the size of a large garden pea, dropped out at its extremity, with a good deal of whitish viscid liquor; and having squeezed the tube several times, a considerable quantity of the same sort of liquor was pressed out; the membranes of the roundish body were strong and tough, and contained a transparent gelatinous substance; the colour and consistence of the white coloured liquor were like to the *semen virile*.

The left ovarium was more than twice the bulk of the right one, and looked like a bag full of a dark-brown coloured water; but, when it was opened, a transparent viscid fluid ran out, and what remained was a reddish substance much of the same consistence as the crystalline humour of the eye has, being the greater part of what this ovarium contained.

There was nothing uncommon in the right ovarium: About half way between it and the extremity of the *Fallopian tube*, I found, in a duplicature of the membrane, such a body as was squeezed out of the left tube, but it was shrivelled and decayed, with little in it of any liquor; the right tube was full of the same sort of white matter as I squeezed out of the left tube.

In the skeleton of this woman, which I preserve, there are thirteen vertebræ of the back, and as many ribs on each side, to wit, eight true

and five false. The cartilages of the two lowest true ribs unite in the middle for about an inch, then divide again, and are inserted separately into the sternum; the two lower false ribs are about two inches and a half long.

XXIV. *An Account of a monstrous Child; by Dr John Burton, Physician at York.*

—WRIGHT, spouse to a ship carpenter living at Kirkthorp near Wakefield in Yorkshire, bore a child that had no parts of generation proper either to male or female, there not being the least appearance of such organs at the place where we should expect to find those parts: The child in every other part was made as is common, except about half way betwixt the navel and *os pubis*, where was a circular orifice of about an inch diameter, in which was a spongy substance resembling the end of the *glans penis*, excoriated; it did not project in the least from the body, neither was it covered, but was quite bare, and very sore and tender. Through the several, and almost innumerable pores or orifices of this spongy body, the urine ouzed continually, and sometimes blood, and, at other times, a reddish coloured serum. The child lived to the age of five years or thereabouts, and died of the small-pox in November last. To the truth of this I can bring many certificates, as well as living witnesses, if it was thought necessary.

XXV. *An*

XXV. *An Essay on the Caries of Bones; by*  
ALEX. MONRO, P. A.

THE nature and seat of a disease being known, there is no difficulty in understanding what chirurgical operation ought to be performed, and the effects of every part of the operation can be demonstrated; so that surgeons are inexcusable if they do not reform what is faulty in the manual part of their business. The effects of medicines not being near so evident, but requiring long and accurate observation to discover them fully, are much more liable to be mistaken. People are too hasty in making conclusions; a single case or two has too often been the occasion of fixing a general rule for the cure of diseases.—— The different circumstances of diseases and patients are not sufficiently regarded, medicines being often ordered more for the name of the disease than for the symptoms of the patient.—— If a cure is made, the success is attributed to the medicines, without any examination whether nature has not made it in opposition to medicines very improper to assist her.—— Men of great fame have been subject to such errors, and they have been followed by the generality of practitioners.—— What people have embraced for truths in their youth they are unwilling to contradict afterwards, and the early impressions which our mind receives are with difficulty effaced; the human mind is the same it was in Horace's days, the *Quo semel est imbuta recens* is still true.—— In so many different ways may people, acting with the utmost sincerity and bona fides,

*fides*, be led into error about the medicines they employ in diseases.

If gentlemen would patiently and assiduously observe the circumstances of their patients, and the operation and effects of medicines:—If, after remarking the evident sensible effects of medicines, they would reason from one case to another, by observing the analogy between them, they would be convinced that the common routine is often not to be followed, but that a more safe and effectual method of cure ought to be pursued:—If no more credit was to be given to writers than what is supported by not only their multiplicity of practice, but by their accuracy in relating circumstances, and by the reasonable indications on which their practice appears to have been founded:—If, instead of taking one or two of our cotemporaries as our constant guides, we would compare several writers of different ages, to discover whose practice was most on a rational foundation:—If these methods were pursued, I am persuaded the common practice, in a great many cases, would soon be changed.

General schemes of this kind are, I know, commonly looked upon as words of course, and as little regarded as if one was proposing a project impossible to be executed. An example of the practice in a particular disease, varied hitherto in many different ways, and most of it founded on very little reason, with a proposal of reforming it according to the plan above mentioned, may possibly have greater influence, which I shall therefore now lay before you.

In complaisance to the desire of several of my pupils;

Pupils, I have chosen for this example, that corrupted state of bones which surgeons name *caries*, *sphacelus*, *teredon* or *tredon*; in treating which, I shall give, in the historical way, a short sketch of what some of the most eminent writers have said upon it: Next, I shall describe the different appearances I have had occasion to observe of this disease; then I shall examine the manifest effects of the different medicines which have been used or proposed for it: And, lastly, I shall consider what method of cure appears most reasonable according to the various circumstances.

In the works commonly ascribed to Hippocrates, the caries is said to be a dried pituit between the laminæ of the bones \*, or earth dried by heat †, or a defect of the mucus ‡.——The account of the symptoms is very incomplete §.——The prognosis is as superficial; for I see no more than that in tedious ulcers the bones are affected, and the cicatrices are hollow ||, and livid flesh in a diseased bone is a bad sign †. As to the cure; cold is said to be hurtful to bones ++, and this disease is to be treated as a fracture ==.

Celsus gives no opinion of the cause of the caries, and describes very few of its symptoms, but is very particular in his directions concerning the cure.

His

\* De morb. lib. 2.

† De carnibus.

‡ De articul.

§ De morb. lib. 2.

|| Aphorism. § 6. Aph. 45.

† Ibid. § 7. Aph. 2.

++ Ibid. § 5. Aph. 18.

= De morb. lib. 2.



His application to bones laid bare in a compound fracture is wine, oil, and suppurants. In a fissure or fracture, where it is not necessary to take out the bone, he orders a cephalic plaister, softened with vinegar, to be applied, and proposes that the same plaister, softened with a cerat of roses, should be used afterwards as an incarner †. His medicine for stopping the hemorrhagy, which sometimes happens in cutting the teguments to lay the skull bare, and after raising pieces of it from the *dura mater*, is vinegar ‡.

In the caries of bones, Celsus's method § is to lay all the carious part bare; and, if it is then doubtful how deep the caries goes, to pierce with the terebra (or pyramidal perforative) till the raspings are no more black.——If the caries is superficial, he orders it to be burnt once and again with a hot iron, that a scale may separate from it, or to rasp it till either drops of blood ouzing out, or the white surface of the bone shew all the carious part to be taken away, when nitre || well pounded is to be sprinkled on the bone.——When the caries is deep, he advises a great many holes to be made through it with the perforative, into each of which a red-hot iron is to be put, till the bone is quite dry; for thus, adds he, the corrupted part will be brought off.——When the caries penetrates to the other side of the bone it must be cut out.——When the

\* Lib. 8. cap. 8. & 10.

† Ibid. cap. 4.

‡ Ibid.

§ Ibid. cap. 2. & 3.

|| Dioscorid. lib. 3. cap. 8. says, nitre and its spuma is biting, and has the force of burning of salt.

the extent of this deep caries is not larger than what the head of the trepan will cover, he employs this instrument to take it out.—If the caries is large, he orders holes to be made round the edges of it with a perforative, and then cutting the bridges between these holes through with a strong knife struck with a hammer, he takes away all the carious part.

The medicines which Dioscorides chiefly recommends for bringing away the scales of bones, or for what is now called their exfoliation, is the powder of the root of the peucedanum \*, and the juice of euphorbium, desiring the teguments to be defended with liniments or cerats, when the euphorbium is to be applied †.

Galen defines bones to be the hardest, most dry and terrestrious parts of the body ‡, whose qualities are cold and dry §. He thought a caries in a bone analogous to an ulcer in a soft part ||, and that it was occasioned either by the adjacent flesh generating a bad sanies, with which the bones being moistened were corrupted †; or that it was owing to a mucous humour drove to the bones ++.

In consequence of this general doctrine concerning bones and their erosion, with the general axiom, that contraries are the remedies of con-

\* Dioscorid. lib. 3. cap. 77.

† Ib. d. cap. 8.

‡ De ossib. in procem.

§ De element. lib. 1. cap. 6.

|| De causis morb. cap. 11. de medic. art. constitut. cap. 6.

† Comment. in Hippocrat. de frast. lib. 2. § 20.

++ Comment. in Hippocrat. de articul. lib. 3.

contraries \*, Galen must necessarily have been led to discharge all things which he esteemed cold †, and to recommend dryers ‡ in a caries. He is very sparing in his recommendations of particular medicines for this disease; opoponax in ulcers of bones and *Rad. Peucedani* for exfoliation §, with some compounded plaisters ||, are all he mentions.

The Greek physicians after Galen have added little concerning this disease, except some few medicines, answering Galen's intentions of cure. *Paulus Aegineta* † has something of a different formula for making the affected part of a bone separate; it is a cataplasm made of the leaves of the wild poppy, and of the fig-tree, with barley-flour and wine; or, instead of it, he recommends equal parts of the *sem. hyoscyami* and of vitriol.

The Arabians added greatly to the list of drying medicines, most of them actually so, that is, in the form of powders, and the greater number potentially so too; that is, such as, when tasted or applied to sores, stimulate, raise heat and some degree of inflammation. They also restored the Celsian practice of burning and rasping diseased bones ++, which had been neglected by the  
Geek.

\* Comment. in Hippocrat. Aphorism. § 5. Aph. 18.

† Ibid.

‡ Ibid. § 6. Aph. 45.

§ De simpl. n. medicam. facult. lib. 8.

|| De comp. of pharmac. §. loc. lib. 10. De comp. medic. per genera, lib. 4. cap. 13. & lib. 5. cap. 2.

† Lib. 4. cap. 50.

++ Avicen. Tract. iv. lib. 4. Fin. iv. cap. 11.

Greek physicians, but has been generally mentioned by writers after the Arabians.

One of the Arabians, Albucasis †, advises, in a compound fracture, where a bone is bare, to put a cloth dipped in black styptic wine into the wound, but not to make use of a cerat, or any thing in which there is oil, lest it make corruption happen to it.

Those who wrote on surgery, when learning began to be restored in Europe, in the fourteenth and fifteenth centuries, copied mostly the Arabians; but, after burning the bone, which is the method of cure in the cases which the most eminent of them are fond of, they applied oily medicines to the cauterized bone †.

After chemie came to be cultivated in the sixteenth century, other methods of cauterizing were introduced.

Angelus Bologninus † tells us, that some in his time made use of scalding hot oil, heated roots of the asphodelus, kindled brimstone, and the water by which gold is separated from silver.

Joannes de Vigo §, besides *aqua regia*, mentions oil of vitriol, *unguentum Egyptiacum*, and vitriol burnt and mixed with aquavita, as cauteries. After cauterizing he dressed with *ung. absterfivum de apio*, and says that, by this method, the separation of the diseased part is made in forty days after cauterizing.

Vesalius

† Chirurg. pars iii. cap. 20.

† Guy de Chauliac. Traité iv.

† De cura ulcer. lib. 2.

§ Pract. medic. secunda pars, lib. 3. De ulcere cum osse corrupto.

Vesalius † mentions *ol. sulphuris* and euphorbium for the caries, but prefers a preparation of antimony, which he does not describe.

Fallopianus ‡ agrees with Vesalius in the form of the drying medicines to be applied, and in the management of a bone after it is burnt; the place, say they, immediately after being burnt, is to be frequently moistened with rose-water and the white of an egg, that inflammation and other symptoms may be prevented; afterwards the eschar is to be ripened with butter or *ung. tetrapharmacum*.

Ambrose Paré † my, more explicitly than Albucasis, that the application of unctuous and oily, or of moist and suppurating medicines, corrupts bones: Paré seems also fonder of the simple dryers, that is, the absorbent powders, than those who went before him, whose dryers were as much potentially so, as actually.

Fabricius ab Aquapendente § reckons aquavitæ among the stronger dryers, and recommends the juice of leeks, with salt, for drying bones further after they are burnt.

Gulielmus Fabricius Hildanus || is rather more positive than Paré in forbidding the application of all moist and oily medicines to bones laid bare; he seems in one part of his writings + to expect always an exfoliation from bones laid bare, though

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† Chirurg. magn. lib. 4. cap. 14.

‡ De ulcerib. cap. 22.

§ Livre. 19. chap. 31. and 32.

§ Pentateuch chirurg. lib. 3. cap. 10.

|| De gangran & sphacel, cap. 19.

+ De ulcerib. cap. 22.

in other places \* he relates examples of bones laid bare being cured without any desquamation.

• Hildanus † introduced the free use of euphorbium and its tincture in spirit of wine, the acrimony of which the writers before him had warned their readers to guard against.

Marcus Aurelius Severinus ‡ takes notice of the shrill sound, as if a void was below, which a piece of bone has when struck after its exfoliation begins. He recommends oil of euphorbium and of lime, as a proper application to corrupted bones ||.

Soon after Severinus's time, that is, about the middle of the seventeenth century, the essential aromatic oils of vegetables were introduced.

Nicolaus Tulpius's\*\* favourite medicine for exfoliation was oil of cinnamon with oil of sublimate.

In the latter part of the last century, not only variety of these oils were used, and different tinctures in ardent spirits and other compositions of the dryers of the antients and of the aromatic oils were contrived; but the alkaline salts, both fixed and volatile, such as *sal tartari*, *sp. sal ammoniac*. &c. came to be employed

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\* Observ. cent. iv. observ. 95. & 96.

† De gangr. & sphac. cap. 19. Observ. cent. i. obs. 92.

Cent. iv. obs. 21. & 95. Cent. v. obs. 21.

‡ De efficaci chirurg. pars ii. cap. 11.

|| Pyrotechin. chirurg. lib. 2. part. i. cap. 4.

\*\* Observat. lib 1. obs. 31.

ployed as well as the acid spirits, *ol. sulphur. vitriol.* \* &c.

While the generality of writers at this time were so fond of the aromata, tinctures, elixirs, spirits, &c. some mention their having cured carious bones by perforating, trepanning, and cutting them out †, or by burning and destroying them with caustics ‡. Others successfully employed watery medicines || and dry lint \*\*.

Among the writers of this time, Wiseman †† is more accurate in relating the appearances of carious bones than former authors. They generally remarked only the black colour, greasiness, roughness, spongy softness, and stinking smell, and thin brown ichor of bones when carious, with the spongy flesh growing out from them. Wiseman observes, that carious bones may be of a white, brown, or black colour, and adds, "If the white be porry, the caries may be deeper and more dangerous than if it were black and hard."

His method of cure is like to Celsus's in several particulars; he orders all the carious part to be laid bare, with caustic applied to the teguments; then to scrape the rotten flesh away,

\* See Barbette chirurg. lib. 3. cap. 8. ——— Verduc Patholog. de chirurgie, cap. 1. des fractures. ——— Car. Musitan. chirurg. tom. ii. cap. 19.

† Scultet. armament. chirurg. tab. 27. explic. & obs. 65. ——— Zodiac. medico-gallic. anni 1679. mens. Decemb. ——— an. 1681. mens. Novembris.

‡ Lamzweerd observ. 90.

|| Scultet. armam. obs. 42. Ruysch. obs. 48.

\*\* Ruysch obs. 5.

†† Surge book ii. chap. 7.

way, or to consume it with escharotics; where that cannot be done, because of large vessels, nerves, or tendons in the way, he desires the orifices of the ulcer to be dilated with sponge-tent, gentian root, &c. But, if the cure of the caries is of greater consequence to the patient than these parts are, and they are so situated, that the cure cannot be made without destroying them, he advises to cut them through to come at the bone. When the carious bone is laid bare, if the caries is superficial, he would have it rasped; and then to be dressed with the milder farcotics, or digesting ointment; in a few days after the application of which, he says, you may see the flesh thrust forth in small grains, which is callus; — Burning with a hot iron, he frequently used with success for hastening the exfoliation. — At other times he pinched away or broke off the caries. — His medicines are the dryers, chemical oils, and escharotics, only that, in several cases where the bone lay deep, he used injections composed of the vulnerary plants boiled in watery liquors, with some ardent spirit, and a little *sp. vitriol. dulc.*

I took notice formerly that Hildanus expressed himself as if he thought bones laid bare must exfoliate; this came to be a general opinion, as is evident from the directions which most chirurgical authors give for treating wounds where bones were laid bare; and Bel-  
 loste \* tells us, it was the universal practice in

B b 2

his

\* Chirurgien d'hôpital, chap. 12.

his time to dilate such wounds, and to keep them open in expectation of the exfoliation. He endeavours to shew the absurdity of this practice, and recommends to surgeons to endeavour to prevent exfoliation in such cases, and for this purpose he not only advised what Fælix Wurtz and Cæsar Magatus had done before him, to wit, to bring the lips of the wound near together, and to dress seldom; but also proposed, that, when a considerable space of the surface of firm bones is laid bare, there should be a great number of small holes made with a perforative of a trepan as deep as the diploe or cancelli of the bones; after which, he says, fleshy papillae rise out from these holes, and extend themselves all over the bared surface of the bones, and the wound is soon cured without any exfoliation. This practice has been approved by some considerable men, though, so far as I know, it has not been general among surgeons.—Belloste condemns the application of acid spirits to bones, as increasing the caries; and being of opinion that the air acts by its acid on bones, he insists, in rather stronger terms than most former writers had done, that bones should be well defended from the air.

Mr Petit \* is the only author of this present eighteenth century, whom I need to mention: He names the several diseases in which caries most frequently happens, and relates the symptoms by which it may be judged that a bone is

\* *Maladies des os*, tom. ii. chap. 16.

is corrupted; such are the deep-seated pains preceding an abscess forming near a bone with a livid colour and sponginess in the teguments; an ulcer continuing long near a bone; the protruding flesh of such ulcer appearing spongy, of a pale colour, easily penetrated by a probe, and bleeding readily without giving pain; the quantity of matter being larger than commonly comes from an ulcer of that extent; the thin consistence, brownish colour, and stinking smell of the matter; its appearing black on the plaisters, though there is no lead in their composition; feeling the bone scabrous and unequal.

Petit observes several appearances rotten bones have, which may make so many species of caries: 1. The surface of a bone may be corrupted, and may notwithstanding be pretty firm and smooth, without throwing out much matter; he calls this a *dry caries*. 2. If the surface of a bone is very unequal, with a number of small holes discharging large quantities of sanies, he names the *caries vermouillé* or *worm-eaten*, from the resemblance it has to wood eroded by small insects. 3. Flesh may grow in the interstices of the corrupted bony fibres, and may fill up the cavernulae. 4. Sometimes the bones are imperceptibly wasted in cancers.

Mr Petit says, the dry caries is generally the most superficial, and cures more easily by exfoliation than the other kinds, which has made him think, "that the exfoliation of bones is only made readily when the carious

B b 3

" part

“ part has no more communication with the  
“ vessels of the sound bone. This commu-  
“ nication entirely stopt gives ground to be-  
“ lieve, that the juices which move in the  
“ vessels of the sound part make an effort  
“ gainst the corrupted part, and that these ef-  
“ forts, redoubled by the resistance, and re-  
“ peated every moment of life, are the cause  
“ which insensibly separates the corrupted part  
“ of the bone.

“ I perceive soon after this rising in  
“ the circumference of the corrupted piece,  
“ which grows more and more. I have rea-  
“ son to believe that proportionally as the first  
“ efforts of the liquors make the separation,  
“ these nutritive juices congeal, and form flesh;  
“ and that it is the insensible growth of this  
“ flesh which compleats the separation of the  
“ piece of the diseased bone, and thrusts it  
“ outwards. I am more certain nature acts  
“ thus, because I find this granulated flesh in  
“ the place where the separated piece of bone  
“ was, and that the good qualities of this flesh  
“ make me certain that the bone is sound be-  
“ low.”

The motion of the corrupted piece of bone, and the blood coming out below it, are the symptoms by which Mr Petit tells us, the exfoliation may be known to begin.

Our author remarks, that the worm-eaten caries, and that where flesh rises in the cavernulae, may be of different depths in the bone, and are more difficult to cure than the dry caries.——When the quantity of sanies (which

(which is generally bloody in the latter species of caries) is very large, there is reason, says he, to suspect it comes from the cancelli, where the marrow is contained, and where the disease frequently begins; from which if it does not find an exit, it will kill the patient.

Mr Petit's methods of cure are these. When the caries is very superficial, and of the dry kind, he dresses it with dossils dipt in spirit of wine, and so do a sound bone laid bare, which he affirms does not always exfoliate.—If the caries is deeper, and an exfoliation must be hastened, he applies to it *aqua fortis*, or spirit of nitre in which quicksilver has been dissolved, which he recommends as a favourite medicine, and afterwards he makes use of spirit of wine.—

He discharges the exfoliating part to be taken away till it is quite loose.—If the carious part cannot be separated by these means, he recommends the red-hot iron, rasping, the perforative, and trepan, as Celsus orders.

After the caries is thus removed, Mr Petit judges by the white, thick, mild matter, firm flesh, and hollow hard cicatrice, that the bone is sound; or he dreads a relapse if the appearances are otherwise.

The general practice of our surgeons is to keep ulcers with carious bones as much dilated as they can by dossils, sponge-tent, &c. to destroy the spongy flesh with escharotics, to apply spirit of wine, tincture of myrrh and aloes, tincture of euphorbium, and such like,

to the bone, and frequently to all the fore.—  
As these ardent spirits are applied to bruten the exfoliation in a caries, they are applied for most part also to sound bones laid bare as preservatives, it is said, against their corruption, and prevent exfoliation.

From this historical sketch of what authors have said of the caries, it is evident how little the circumstances of this disease have been considered, and what a contradictory and medley of practice has been followed. Scarcely all of it could not have been supported by observations tolerably made. Of late, indeed, some species of this disease have been distinguished, but the practice is too uniform in all of them. To reform this, it will be necessary to examine more accurately the appearances of this disease.

Previous to any account of the caries, it will be necessary to remark, that bones have their vessels and circulating fluids, and in short the same general texture which other parts have, so that solidity and stronger cohesion of parts are the only evident distinguishing characters of the composition of bones: Of this truth there are many proofs, such as,

1. Bones are in the state of membranes and cartilages before they ossify.
2. The hardest bones have sometimes changed back again into a soft state.
3. The granulated flesh which rises out from bones after fractures, amputations, the trepan, or in exfoliation, differs nothing from what

what would come from any soft part, yet in several cases becomes found solid bone.

4. When the texture of bones is unrevelled artfully, and compared with the texture of the softer parts, it appears alike in each.

5. By a chemical analysis the same principles are obtained from bones as other parts, the proportions of these principles being different in different parts.

6. By comparing the diseases of bones with similar ones in softer parts, as I shall do in considering the different species of caries, the general proposition of bones differing only in solidity and cohesion of parts from the other softer organs of the body, will be further confirmed.

The species of caries which I have had occasion to see, are,

I. What Mr Petit calls the *dry caries*, where the bone is pretty smooth and firm, and throws out little matter; though the surface of the carious part of a bone, in this species, is not of a very dark colour at first, yet before exfoliation it becomes of a dark brown or black colour. An exfoliation is more easily obtained here than in any other kind. Before the corrupted part can otherwise be observed to separate, one will hear, as Severinus remarks, a shrill sound when it is struck with a probe, as if it was hollow; soon after this the edges of the carious part rise a little, and pus, or, if it is pressed, blood is seen coming out below them; granulated flesh then appears at these edges; the bone is more raised gradually towards the middle,

middle, till all the carious part is separated from the new sprouting flesh, which rises up on the whole surface of the bone below, and seems to push off the carious squama, so that it becomes quite loose, and can be taken away without any violence. The ulcer is then in a fair way of curing, and though a considerable thickness of bone has come away, yet, in some time after, little depression is to be felt on the surface of the bone, the new flesh having gradually become harder, till it supplies in a good measure what was taken away.

Whoever has seen the separation of a gangrened piece of skin, or of the eschar of a caustic applied to the skin, where a fissure first appears in the margin of the mortified part, pus begins to ouze out there; the division between the sound and mortified part becomes larger, new flesh rises, the separation goes on from the circumference to the center, till the mortified part drops off, and the new flesh supplies its place; whoever, I say, has seen this, and compares it with the phaenomena of the dry caries, will judge that, allowance only being made for the rigidity of the bony fibres, which cannot contract as the fibres of the skin do, the appearances are the same in both cases, and therefore I would call the state of bones described above, the *gangrenous caries*.

II. The second kind of this disease is Mr Petit's worm-eaten caries, in which the spongy or cavernulous texture is evident; it has not such a dark colour as the former, the quantity

tity of matter sent out from the cellules of the bones is greater than in the former kind, and is vastly increased when the corrupted sanies comes out from the marrow in the cancelli. Pieces of the rotten bone may be broken off here, or they may fall away, but no regular exfoliation is to be expected, unless when by art it is reduced to the former species. The gradual wasting of the bony fibres by the suppuration, is often very remarkable in this caries; a piece of bone which appeared as large as the end of one's thumb, and of a solid substance, shall become less than the point of the little finger, and so spongy that it can scarce be touched without breaking.

The worm-eaten caries, where the substance of the bone only is affected, may be compared to an ulcer of the soft parts, which has a number of little sinuses in its sides, such as I have frequently seen when hard tumors had only in part suppurated, and were not all melted down into pus; drops of matter could be seen drilling out from the numerous orifices of the small caverns in its sides.—When the sanies comes from the corrupted marrow in the cancelli, the disease is analogous to an abscess, the matter of which has eroded a number of small holes in the skin.

III. Frequently a spongy, bleeding, fleshy substance rises in all the little caverns of the worm-eaten caries, when it may be called *carnous*, and is much a-kin to ulcers with hyper-sarcosis.

IV.

IV. As the soft parts are dissolved down into a mucaginous substance which destroys their original form and texture in the white swellings, as they are called, so in this disease, and some others, the periosteum becomes thicker, the bone turns softer, its surface is eroded, a yellow red spongy substance sprouts out, and, proceeding deeper into their substance, wastes the bony fibres.

The difference of the appearance of this kind from what I call the carious, that in the carious the spongy flesh grows out of the caverns, while the grey or brown coloured spongy bony sides of them still remain; whereas in the other, the bony fibres disappear wherever the spongy flesh comes, so that one can scarce determine by the probe whether or not the bone is carious. Upon scraping away this bone-consuming flesh, the surface of the bone appears rough indeed, but not much eroded nor greatly altered in its colour.

I have seen some ulcers in soft parts, where such a consuming spongy flesh rose.

V. Frequently upon opening an abscess one shall see at the bottom of it a white smooth bone, without its periosteum or connection to any of the neighbouring parts, except by its ligaments at its extremities. By any trials we can make, and by what we can judge from the consequence of the bone's changing its colour gradually as it continues exposed to the air, and the necessity of its coming all away before any cure can be made of the ulcer, it appears, that there is no circulation of liquors

quors in such bones before the abscess was opened.

This way of bones mortifying happens most commonly in scrophulous patients, in whom something analagous to this is likewise often to be observed in the glands, round which a slow suppuration is made, which leaves them almost entirely separated from the surrounding parts.

VI. In one species of exostosis the tumefied part of the bone is softer than the rest of it, and is not composed of regular fibres, nor cavernous, but as if the ossifying juice had been thrown out irregularly; over which a cartilaginous or tendinous substance is spread; and from this a firm, shining, smooth flesh grows out, which, after the teguments are removed, sends forth a thin, stinking, acrid sanies; the patient complains often of throbbing pains in it, and sometimes considerable haemorrhagies are made from imperceptible vessels in its surface. May not this be compared to ulcerated cancers of glands?

VII. In the spreading, eating cancers, which all practisers know the symptoms of, the bones are wasted as well as the soft parts, and the appearances are the same in both, unless that the bones do not consume quite so fast.

Having mentioned from Wiseman and Petit the general symptoms by which we may suspect or know that a bone is carious, and having described what different appearances I have seen in corrupted bones, I should, if I intended a regular treatise, proceed to the aetiology and prognosis of each; but the former

would lead me into too large a field of dispute, and the latter would require so many suppositions as would be tedious, or would be so general as to be of little more use than the common directions laid down by practical authors easily guide one to; I shall therefore proceed directly to the therapeutics.

In treating any caries, it is altogether necessary to examine strictly all circumstances, and to discover, if possible, what cause, either general or topical, may have made the corruption of the bones, that endeavours may be used to remove it, if it still subsists. Seeing it would be very improper to pretend to give here directions for the cure of the *lues venerea*, scrophulæ, scurvy, gangrenes, abscesses, wounds, contusions, and all the other diseases which may occasion caries, I must confine myself to the topical management of the caries, without any regard to the habit of the patient, or to any other disease.

A speedy and safe separation of all the corrupted part is then the principal indication to be pursued; for executing which you have seen from the history very many means have been proposed: To know which of these are preferable in the different cases which may be under our care, it will be necessary to consider the evident operation and effects of the several medicines proposed, which may be reduced to the following classes:

1. The insipid, terrestrious absorbents, such as, powder of coral, crabs eyes, &c. put into an ulcer, where a bone is carious, can have little other effect than to imbibe the matter of the;

the ulcer; if they fall into any cavernulæ of the corrupted bone, they may remain so long there as that the matter that they imbibe may become acrid. Charpie lint, is an absorbent which has not this disadvantage.

2. The powders which have aromatic or other acrid particles in them, such as, *Pulv. rad. aristoloch. bryon. peucedan. aloe, myrrh, euphorbium*, not only absorb liquors, but give more or less stimulus in proportion to their acrimony; and as the effect of all irritation is some degree of inflammation, which in sores is principally removed by a subsequent increased suppuration, these powders may assist to separate corrupted from sound parts.—Such of them as have balsamic particles in their composition encourage the suppuration most.—Several of them resist the putrefaction of animal substances; and therefore may preserve a carious bone, or the matter coming from it, from such a high degree of putrefaction as they might otherwise go to.—Besides these effects on the sore, regard must always be had to their operation, if any of their particles are absorbed into the blood-vessels; for some of them produce more or less of fever, others become purgatives, &c. according to their different powers, which are known to those who are acquainted with the virtues of drugs.

3. Ardent spirits, *e. g. aqua vitæ, sp. v.* being liquid, can be introduced further into a carious bone than powders can; they stimulate sores, resist putrefaction, harden the fibres, coagulate the liquors, hinder suppuration, and quicken the pulse when absorbed.

4. The tinctures of the powders N<sup>o</sup> 2. in the spirits N<sup>o</sup> 3. partake of the nature of both, but principally of the spirit, of which the larger share of the composition consists.

5. The essential oils, *ol. cinamom. cariophyll. &c.* stimulate, erode, resist putrefaction, and, mixed with the blood, raise some degree of fever.

6. Common oils, balsams, resins, relax, increase the putrefaction, and are allowed universally to be the most effectual suppurants and incarners.

7. Water relaxes the solids and dilutes the fluids, when nearly of the same heat with animals.

8. Vinegar stimulates and resists putrefaction; when weak, enjoys also the virtues of water; when strong, approaches to the 10th class.

9. The natural salts, nitre, sea salt, allum, the vitriols, have different degrees of pungency, and proportionally stimulate or erode, otherwise they preserve animal substances from putrefaction.

10. Acid spirits extracted from fossils by the force of fire, such as *sp. nitr. sal. marin. ol. sulphur. vitriol*, &c. coagulate the liquids, and mortify the solids; by being diluted with water they approach to vinegar.

11. By dissolving metallic substances in those acid spirits, generally their corroding sphacellating power is increased, and some of them give such violent pain as frequently to bring on convulsions.

12. Me-

12. Metallic bodies corroded by acids generally erode when applied to sores; some of these, for example sublimate mercury, and some other mineral substances, particularly arsenic, have shaken the whole frame of the body when applied externally, and the mercurial preparations do sometimes enter the blood to produce a salivation.

13. Alcaline salts and spirits, *sal et sp. c. c. sal. et sp. sal ammoniac. cineres clavellat. sal. tartar. Al. tartar. &c.* stimulate, erode, and increase putrefaction; when absorbed, as the volatile ones very readily are, they quicken the pulse. The eroding power of these salts is greatly increased in their preparations with quicklime, as in the common caustic, which mortifies any part of a living animal it is applied to, but with remarkably less pain than what the acids or their preparations with metals give.

14. All bodies heated beyond a certain degree and applied to our bodies give us pain, stimulate, and inflame; when greatly heated, they mortify whatever part of an animal they touch.

15. The effects of rasping, cutting, breaking, and trepanning bones are altogether evident.

16. In every wound or ulcer, the matter discharged into it must be the most constant application to the sides of the sore; when this matter is laudable mild pus, it is one of the most powerful good digesters, suppurants, and incarners; when it stagnates too long, or when the liquors or vessels are faulty, it may become

come an acrid, stimulating, eroding sanies; when absorbed into the blood, it infects all the liquors, stimulates the vessels, and is capable of producing violent disorders.

The effects I have attributed to these medicines are such as are evident to the senses, and what all who practise know, but don't always consider when they make use of them, otherwise they would have adapted them better to the several species of caries, and to the different stadia of each; to the cure of which I now proceed.

*Of the dry or gangrenous caries.*

When the dark colour and dry surface of a carious piece of bone shew it to be fully mortified, especially if the shrill found and rising edges of it, with pus coming out below them, discover the exfoliation to be begun, nature of herself, or with very little assistance, will make the cure.

If the pus is mild and in due quantity, it will prove the best suppurant and incarner for making the new flesh thrust off the carious piece of bone, care only being taken not to remove it too frequently, nor to allow it to remain so long as to become too acrid.

If the quantity of pus is too little, it is to be supplied by the medicines whose effects are nearest to it, so that those of the sixth class are proper, *ung. basilic. liniment. arcae*, or such like, every surgeon employs to hasten the falling out of a piece of skin mortified by

a caustic. I have often employed them with equal success in bringing away a squama of a carious bone, the separation of which would necessarily be retarded by every thing which checks suppuration and the growth of new flesh, as the common favourite medicines comprehended under class third and fourth necessarily do; though, it must be acknowledged, nature, with the assistance of the balsam of her own preparing, pus, will often get the better of all that surgeons do against her.

While the exfoliation is making, the external opening in the teguments is large enough if the pus is so evacuated, that it neither forms sinous ulcers, nor is absorbed to taint the blood; for otherwise it hastens the separation of the carious part of the bone more by being collected upon it, than when it has a free exit.

If, by the external orifice being small, either of the bad consequences just now mentioned happens, the aperture ought to be enlarged either by filling it with prepared sponge, which expanding itself stretches the orifice; or it may be enlarged by cutting with a knife or eroding with caustic the teguments which cover the caries; and they are afterwards to be kept asunder by filling the sore with soft doffils, and pressing them in gently by a proper bandage.

When the colour of part of a bone is considerably altered from what it should be in a sound state, but is not so dark as it can be judged to be entirely mortified; while there are no signs

signs of its separation, it may prove a very tedious task to trust the exfoliation only to nature; and therefore, after laying all the altered part of it bare, if it can be done by the methods proposed in the preceeding supposition, the surgeon ought to try with the perforative or with the rasper, how deep the disease goes. If it is only superficial, a compleat mortification is to be made, by applying a red hot iron or potential cautery; after which the case and its management is the same as was mentioned already.

If the alteration in the bone is deeper than the action of the iron or caustic can reach, the surgeon may cut off all that is suspicious with a very sharp instrument struck with a wooden mallet, which gives little shock to the member; after which he is to promote as much as possible the sprouting of granulated flesh, such as rises in exfoliations, from the whole surface of the bone, without which no cure is made, but the surface anew alters its colour and corrupts. If it was asked surgeons, what the medicines are which would most readily procure the growth of flesh, they would readily answer in general, pus and balsamic or unctuous medicines; and such they would apply in all such cases except where bones are bare. For what reason this exception should be made, I understand not; the parts which yield new sprouting flesh with the greatest difficulty ought, one would think, to have the most powerful incarners applied to them; and now, after a great many trials, I can assure you that no medicines so effectually prevent the

the corruption of bones laid bare, and assist to cover them so soon with flesh, as ointments, balsams, and dressing seldom, to have the assistance of the most effectual balsam of all, pus; with these we see daily the extremities of amputated bones covered over with flesh, and by this method I have had the pleasure to see large parts of the skull, tibia, and other such very solid bones, covered in a little time with granulated flesh, after they had been laid quite bare by wounds made even with braising instruments, and likewise after their exterior carious surface had been cut off as directed a little above, and a compleat cure was made without the least observable exfoliation.

'Tis plain that, in the case I now treat of, where the corrupted part of a bone has been all cut away, or when sound bones have been laid bare, and we wish to make a cure without desquamation, that all medicines which can mortify the exterior fibres, such are all eroding medicines, are to be shunned; as are also all such as harden and dry fibres they are applied to, so as to prevent the growing of flesh, which ardent spirits most effectually do; and therefore, of all the classes of medicines which I mentioned, there are none, except the absorbents N<sup>o</sup> 1. and 2. the unctuous and balsamic N<sup>o</sup> 6. and water N<sup>o</sup> 7. which are not opposite to the indications of cure. The terrestrial absorbents are of no use; water dilutes and washes away the pus, so that some of the more active or balsamic powders and the

the unctuous medicines can only be the proper remedies here.

Whoever has taken notice of the progress of the exfoliation of a bone, or of the cure of a bone laid bare without exfoliation, must have seen the granulated flesh rising from every part of the surface of the bone to cover it, and that what flesh grew out from any neighbouring part, tho' it may lie over the bone and hide it from one's sight, yet it does not grow to the bone, and no cure is made unless by what rises from every point of the bone; nay very often surgeons are obliged to destroy such overlopping spongy flesh to promote the cure: from which it is reasonable to conclude, that Belloste's dressing seldom contributed much more to the cures he performed without exfoliation of bones laid bare, than the holes he proposes to be made with a perforative into the diploe or cancelli; the flesh rising from that softer substance, overspreading the surface in the circumference of the holes, can be no better than the spongy flesh which hangs over the bone from the sides of the sore.

If, notwithstanding our endeavours to make flesh rise from the surface of a sound bone laid bare, or of one that has had its mortified surface cut off, we cannot obtain this wish'd for incarnation; and the surface of the bone shews its beginning corruption by a change of colour; it must be treated as above directed in the case where we supposed a superficial caries; it must be compleatly mortified.

When the carious part of a bone is too thick for being separated either by the raspe or chizze.

Rizzel, it is to be taken out with the exfoliating trepan, or by making a great many holes in the circumference of the caries; and then cutting the bridges between them through, the middle of it is raised or cut off; after which the management is the same as in the preceeding case.

Very often there is not space enough in the fore to apply right the instruments proper for cutting away the carious part of a bone, and it cannot be safely enlarged; when this is the case, we can only hasten the exfoliation by fully mortifying all that is spoiled, by repeated applications of a red hot iron or of potential cauteries. When the hot iron is to be used, the bone ought to be previously well dried, that the iron may not be extinguished by the moisture; and we are commonly desired to guard the sides of the fore with wet rags; whereas, when either the iron is to be applied from time to time, or we can judge that the exfoliation cannot be speedily made, while we wish to continue a large external opening, the reasonable practice is of design to burn the sides of the fore into a fully mortified eschar, if some part is not to be hurt, the burning of which might be of very ill consequence; for while this dead eschar remains, less moisture will be thrown out to prevent the effect of the cautery, and the subsequent applications of the hot iron can be made with little or no pain to the patient, and the orifice does not contract.——If a carious bone, which is to be burnt, lies deep, the hot iron ought to be introduced through a canula

nula placed upon the bone, that the iron may be rightly directed.

If the potential cauteries are chosen rather than the actual, the common caustic, prepared of quicklime and soap lees, deserves the preference to any of those composed of the acid spirits; for it gives not near so much pain, and is not so apt to occasion convulsions: It penetrates better than the dry forms of eroded metals, and does not run so much when it melts as the more liquid acids do; it either is not absorbed, or its effects are not observed in the blood: Whereas the mercurial preparations frequently raise an unexpected salivation.——

The reasons given for burning the sides of such a sore as I now treat of, are equally good for forming an eschar all round the sides with the potential cauteries.—— This eschar ought to be kept from separating as long as the surgeon can; the most effectual way of doing this is to soak it frequently with ardent spirits, by which management the exfoliation of the sides (pardon the expression which I use to shew the analogy) may sometimes be near as long in making as the exfoliation of the bone, if the suppurants, pus, and digesting balsams, are rightly applied to it.

When the affected part of the bone is fully mortified either of these ways, the case is reduced to the supposition I first made, and is to be treated in the same way.

Though necessity obliges us to use caustics in the very deep dry caries, yet, because they require so much time and so frequent applications before they can pierce through any considerable

derable thickness of a solid bone, I would prefer the surgical instruments with which the whole corrupted part can be taken away at once, where-ever they can be conveniently made use of.

After an exfoliating piece of bone is moveable, the orifice of the sore ought to be made so large, by the methods formerly proposed for enlarging orifices of sores, as the separated piece can easily be brought out, and without leaving any considerable hollow ulcer under the skin; for thus the pricking pain, which a loose piece of rotten bone frequently occasions when left to work its way through a small passage, and the suppurations which may be occasioned by its remaining under the teguments, may be prevented, and there is no danger of leaving a sinuous ulcer, which may require more time and labour than is otherwise necessary for a compleat cure of the sore, which needs no other treatment, after all the corrupted bone is brought away, and the sound part is covered with firm flesh, than what any common ulcer does.

The cases I have supposed may serve for understanding the different stadia of this dry caries, with the management necessary in each; and therefore I proceed to the second species of caries which was mentioned.

*Of the Worm-eaten Caries or Ulcer of the Bones.*

The cells formed in the eroded bone in this species of caries lodging and retaining the acrid

crud putrid fanies, which increases the disease, it is necessary to destroy all the affected part of the bone as soon as can conveniently be done. — Where-ever the proper instruments can be applied, rasping, chizzelling, or trepanning, according to the depth or extent of the caries, will most speedily answer the intention. After any of these operations are performed, the method of cure is the same as was proposed when we supposed these operations to have been performed in the dry caries.

When the fanies comes from the cancelli of the bones, the corrupted sides ought to be taken out by one or more applications of the trepan. — If the carious part is of a large extent, the trepan is to be applied all round the circumference of it, and, the bridges being cut through, it is to be all raised up. Robert Watson was received into the infirmary for a swelled carious tibia; the teguments were all mortified by caustic, and then cut away; the operation of the trepan was performed fourteen times in the circumference of the corrupted part, and all the anterior internal side of the middle of the tibia was taken out; new flesh rose from the cancelli, and became firm bone before he went from the hospital.

If less of the firm sides of the bone are found to be corrupted than what, upon opening the cancelli, we discover them affected, care must be taken that the matter within the bone should be easily discharged.

When, by the orifice, through the sides of the bone, being in the lower part of the putrid cancelli, the matter easily flows out, or all the

affected cavity can be filled with proper dressings, the cure may be made without taking any more off the solid sides of the bone. The late Mr Macgill and I were consulted about a girl who, after the small-pox, had an ulcer very near the internal malleolus; a hole was eroded by the matter through the bone large enough to let one's finger enter; a probe was introduced three inches upwards within the tibia, without meeting any resistance; but, on directing the probe downwards, we felt the bone full of firm flesh. A pastill, made of myrrh, aloes, and honey, had been put every day into the bone, and the girl had a constant purging, which ceased a day after; we ordered the aloes to be omitted in the dressing of the sore. An injection composed of digestive and melrose, dissolved in water with some vinegar, was thrown every day into the bone, the pastill of myrrh and honey was introduced a little way, the cavity of the bone gradually filled up with new flesh, and a compleat cure was made.

When the sanies stagnates because of the unfavourable situation of the aperture in the sides of the bone, one or more new openings must be made with the trepan, till either the sanies has a free exit, or all the part of the bone covering the putrid cancelli is taken away, when the common cures for other ulcers are to be employed.

If we cannot perform the necessary operations for removing a worm-eaten caries, we must burn it frequently with a red-hot iron; the directions for which operation were already

dy given in treating of the dry caries. The hot iron seems to be preferable here to the potential cauteries; because these only sink into the cells and erode deeper than we incline, while they might not destroy the exterior part.

When in this species of caries the sanies is in great quantity and very foetid, and the bone cannot be come at to do what is necessary for a free discharge, so that there is reason to be afraid that not only the bone may be further eroded, but that the sanies may be absorbed to occasion hectic fever and all its fatal consequences, it will be fit to encourage the discharge of the matter as much as possible, and to apply such medicines as blunt or destroy its acrimony. It is therefore necessary to dress frequently in this case, and to wash out the sanies at each dressing with a proper liquor. Ardent spirits, the tinctures made with them, and essential oils, do indeed destroy or confound the putrid smell of such sanies, and, by contracting the vessels of any sore they are put into, lessen the discharge of the sanies, which makes them answer the old theory of their being proper medicines for the caries of bones, which disease was supposed to be owing to too much moisture thrown upon the bones, whose natural quality is dry, and therefore required drying medicines to cure them. These, I am persuaded, have been the reasons why those medicines came to be employed for carious bones; but, from what has been observed of the different circumstances of caries, it is evident that these reasons cannot be al-

ledged.

ledged for employing them in all caries : And in the very case which we now consider, and which is the most favourable for using them, there are objections to them, which make others appear more reasonable to be employed, and which, upon trial, I have found more successful. The objections are, that ardent spirits and essential oils in very small quantity, or diluted, (for when pure and in large quantity they are caustic and penetrate too deep), retard the separation of the corrupted parts ; they render all the ulcer callous, which is indeed of some advantage to prevent proud flesh while the bone is not separated, but is troublesome to remove afterwards ; they are very readily absorbed, and produce more or less fever, which hurts the patient. Some of the most common tinctures employed, that of aloes particularly, frequently brings on a constant purging. Common digestive or honey, or both dissolved in water, with which vinegar, or some drops of an acid spirit have been mixed, more effectually correct the putrid sanies, and can be used in any quantity to wash it out of the sore, without either retarding the separation of the spoiled bone, or raising the least disorder if absorbed, but, on the contrary, preventing the mischief which the absorbed sanies would otherwise produce.—When the ulcer is deep, this medicine ought to be thrown into it from a syringe, that it may penetrate every where, and may bring the sanies away with it when it recoils.

*Of the Carnous Caries, or Ulcer of Bones with  
Hyperfarcosis.*

This disease differing only from the immediately preceeding in the addition of spongy flesh growing in the cells of the bone, the general indications of cure alter very little; only, as this flesh bleeds easily and obstructs the surgeon's view, the rasping, chizzelling, and trepanning cannot be so proper here as the cauteries for destroying the corrupted part; and seeing the liquors constantly oozing from the spongy flesh soon extinguish the hot iron, the potential cauteries are preferable to the actual cautery. The application of the caustic will require to be frequently repeated, because this kind of caries is generally very deep, and therefore it will be convenient to make an eschar round all the sides of the ulcer at the first application of the caustic, and to keep it as long on as we can by soaking in ardent spirits, that it may serve as a fence for preventing the future caustics from spreading too far, or giving pain. The moisture which the spongy flesh in this disease spews out, especially when irritated, is so great that I have daily dressed such sores with powder of common caustic, removing a considerable quantity of gelatinous stuff which collected on the surface, where the caustic had been applied instead of the eschar, which uses to be made in dryer parts.——If the caustic makes an adhering eschar, it is in vain to apply any more caustic till that eschar separates; which is to be hastened by suppurant oint-

ointments.—By such repeated applications of common caustic, I have in a very short time consumed a whole metatarsal bone of the great toe of an adult, and have penetrated into the cancelli in the middle of a tibia, the lesser and more spongy bones consuming sooner.

What has been said of the two former species of caries will readily make one know what further is to be done in managing the different stadia of this caries; it is sufficient for my purpose to have mentioned what is peculiar to this disease.

*Of the Phagedenic Caries with Hyperfarcosis*

The management of this caries is nearly the same with the former, only one or two applications of the potential caustic are sufficient to mortify some of the surface of the solid bone, which seems to reduce it to the dry caries. But I must observe, that, when this caries is partial, I mean when it only seizes one part of a bone, which seldom is the case, the flesh which thrusts off the mortified squama is for most part as phagedenic or bone-consuming as what appeared at first; and therefore, even in this most favourable supposition, the surgeon should not promise a cure unless he has corrected the habit or topical indisposition by internal remedies.

When this disease has taken firm roots, it will spread upon one end of a bone which was in appearance sound when the cure of the other end attacked with it was begun; and it will

will creep along from one bone to another with this disadvantage too, that it is far advanced before one can well discover it.

*Of the scrophulous Caries.*

The spoiled bones here being principally retained by their ligaments, which we seldom can conveniently come at to cut through, and which are too sensible to be eroded, surgeons not only lose their labour, but do considerable mischief when, in treating such patients *secundum artem*, they forcibly keep open and dilate the orifices of ulcers where such bones are, by cramming them with hard dressings, kept in by a firm bandage, and by wasting down the spongy flesh with escharotics, while they are forcibly endeavouring to make the bone come away: Such tender constitutions as these patients have cannot bear such rough treatment; they languish and decay under it. What I have always found of most service, or rather that did the least hurt, was to destroy fully the teguments covering the abscess formed in the bone with caustic, to cut the eschar through the middle, to evacuate the collected matter, and to save the eschar on the sides as long as I could, to order very mild applications afterwards to the fore, and to wash it frequently with water for assisting the discharge of the matter; or, if the matter became foetid, to mix a little vinegar with the water. Nature at last separates the bone, which is to be taken out whenever it is quite loose.

*Of*

*Of the Schirrho-cancrous Caries.*

Actual and potential cauteries have the same effects here as in ulcerated cancers of glands: they do not diminish the tumor, create great pain, occasion haemorrhagies when their eschars separate, &c. Most other medicines do mischief, none of them do good; extirpation only can make a cure, which may be done either by trepanning round the root of the excrescence, cutting the bridges between the holes, and bringing all away, or the member is to be amputated. All of them I have yet seen were so situated, that it was impossible to make the partial extirpation; so that I cannot say positively how it would succeed. After amputation of the member, the wound cures as well as in other diseases, but some of the patients have since been seized with the same disease in another member.

*Of the spreading cancrus Caries.*

This sort of cancer seldom cures; it will sometimes get a skin upon it after cutting or burning, or with gentle drying medicines or dry lint, often breaks out again unexpectedly; in short, it is one of the *opprobria medicorum* which there is no certain cure yet found for. I never saw this disease originally formed in the bones; they are only affected by being in the way of the disease, so that whatever change the original disease undergoes, the bones partake of it.

VI. *Of the Separation of Tendons in Sores;*  
Dr THOMAS SIMPSON, *Professor of Medicine in the University of St. Andrew's.*

IN the case I sent you of John Daw, which you were pleased to cause to be inserted among the papers of the fourth volume of the Edinburgh Medical Essays, who, from a contusion of one of the flexors of the fore-finger, came to lose two of its joints, and with difficulty saved his hand; you will find that, before the cure was completed, there was a tendon separated and carried out of the ulcer of the metacarp. This separation of a tendon, or some part of it at least, though not taken notice of by any chirurgical writer treating of the hurts of the tendons, as far as I have yet found, has nevertheless often occurred to me; and some very unexpected cures have followed upon it; so that I thought an account of them would be agreeable to the public, and might contribute to enlarge our views as to the nature of these misfortunes that happen upon such hurts.

Eleven years ago, a baker in St Andrew's, after being some time employed in sifting wheat, found a violent pain immediately above the third joint of the thumb, where the flexor tendon is inserted, and upon which the sieve had rested. With the pulsation and pain, which darted out at the extremity of the finger, he could get no rest; so that next day he asked my advice, when I found his whole hand swelled. I immediately applied to the seat of the

the trouble I roasted onion beat up with some white soap; and, after twenty-four hours, I found a small tumor rise upon that part with fluctuation. Laying this open with a lance, a bloody serous mater issued out; to encourage which I applied a pultice of oat-meal with balsilicon; hence a more liberal flux, but the matter no way changed. On the fifth day, the whole thumb was blistered round with the same bloody serum, and a fungous flesh at the wound; upon this I dressed it with tincture of myrrh and aloes, and Arceus's liniment, and afterwards with warm spirit of turpentine. The pain turned easier, but there was no appearance of the wound healing, till at length, observing a membranous loose body within it, I pulled it gently with pincers, and without much resistance brought it out, several inches in length; then, by the continued use of the terebinth, the fungous flesh kept at under, and the wound cicatrised after a month's illness. I reckoned that the membranous substance was the sheath of the flexor tendon. After this my patient had the use of his thumb as formerly.

I had much the same process in a fisher, after I had cut out a hook near the flexor tendon of the middle joint of the fore-finger; only in him, after the swelling had continued for some time with fungous flesh at the wound, I fomented it with warm four claret; upon which a long ligamentous loose body shewed itself, and was easily drawn out as in the former case; after which all the symptoms immediately abated.

I applied the four claret, having seen a sudden good effect of it in a workman who had hurt the flexor of his thumb with a glass, upon which the whole hand swelled, an abscess formed at the inner side and middle part of the thenar muscle and was laid open; but at the same time the swelling spread to the annular ligament at the carpus; in which case I gave seven doses of the bark to try if, in this inflammatory state, it would do any service, it having lessened the inflammation accompanying the gangrene in John Daw; but here it had no effect. In the mean time I applied fomentations of warm claret, under which management an abscess formed, as I have seen in tendinous parts upon a close application of warm brandy, and, upon opening it, two spoonful of good pus issued out; nevertheless, tho' a cataplasm of oat-meal was applied, the part hardened, and a great deal of fungous flesh, such as for ordinary accompanies the wounds of the tendinous parts, appeared; upon this applying only warm four claret, all subsided, and the hand very soon was quite restored; so that I could not but observe the different effects of this in such a case from that of the most softening cataplasm.

In a woman who had an erysipelas over the back of her hand, with horror and fever, from some unknown cause, at length an abscess formed, whence I from time to time drew several portions of tendons; all of which, as in every other case, were somewhat round, tho' broader than thick, and plainly a distinct body

ly by themselves, being smooth and entire all round the surface.

I shall finish these accounts with one I informed you of twenty years ago, when I was at Glasgow. An old woman, who had fallen upon her elbow, shewed it me, with an excoriation and a small orifice; at which, probing it, I distinctly found the bone rough, and the matter very foetid. This, in my early practice, made me immediately consult Mr Gordon, a surgeon of great accuracy and judgement in that place: He, from the sudden caries, excessive putrid smell, and gangrenous flesh for the breadth of half a crown round the orifice, suspecting the worst, desired me to consult the rest of our faculty in that place; and all seemed to agree that an amputation of the part was the only thing to be trusted to: But, considering her age and weakness, they thought the success doubtful; and therefore agreed to foment it often with aromatics and spirits, and give her inwardly a strong decoction of the woods. After eight days management this way, we found small change in the appearances: But after this something of a loose body appearing at the orifice, which was now considerably enlarged, it was pulled out, being as thick and large as one quarter of an ordinary herring milt, and something of the form, though somewhat putrid at the extremities, but firm and tendinous at the middle. After this the matter decreased: But another abscess appearing some inches above, we opened it, which soon healed along with the first sore, without any loss of the use of her arm, (which she

employed in her ordinary work for some years afterwards) or any apparent exfoliation, as I have seen in other cases with carious bones, especially in the small-pox.

When these cases, to which I could have added several others, are compared, I reckon they will be allowed much of the same nature, tho' in different parts of the body; and that if such cases be ranged among the species of the panaris, when happening at the fingers, they should be so likewise at the metacarpus and elbow; though I think, by so doing, as some of the moderns have done, we needlessly confound some diseases proper to the nails and others proper to the tendons, which might easily be kept distinct. But having finished what was the principal design of this paper, to wit, to shew how frequently such tendinous bodies separate in hurts at the joints, and under what management they may easily be made to separate, so as there may be no occasion for the dangerous incisions directed by some to be made on the inflamed tendinous parts; I shall conclude my paper with observing, that, in a sound body, the tendons can be drawn out and separated by force from their muscles, as we see in the sixty-second observation of Peter de Marchettis, where a servant had the last phalanx of his thumb drawn off by a horse, and with it one of the flexor tendons, twelve inches in length. Here I must mention another patient of my own, aged fifty, who having wounded himself with a hook, in cutting down corn, upon the flexor of the last joint of the little finger, came to me, after the loss of this joint,

joint, with its neighbour loose and carious, and a small gangrenous ulcer between the first joint and metacarp, where the tendon was laid open. When I was fomenting from time to time, to curb the progress of the gangrene, the fellow himself, impatient under the pain, catching the second joint, pulled it off, and with it the tendon, some inches in length; after which he was very speedily cured, as the others I have mentioned were.

XXVII: *Histories of the Cure of Lymphatics opened in Wounds; by ALEXANDER MONRO, P. A.*

I Do not observe that chirurgical writers take notice of a phænomenon which I have seen several times in the cure of wounds, which possibly young surgeons may be at a loss to understand, or to know how to remedy; it is the rising of a fungous substance, from which there is a constant stillicidium of lymph, which prevents a cure, and weakens the patient, if it is allowed to continue long: To assist them, I send you here two of the most remarkable examples of such a case that I have met with.

In May 1726, I extirpated a very large steatom from the left arm of a servant of Mr Graham of Killearn. It had been occasioned by a bite of a horse about twenty years before: Its base reached from the middle of the deltoid muscle to near the elbow; so that the cephalic vein ran along the middle of it, and was necessarily to be cut through twice in amputating the tumor. The cure went on very successfully,

fully, the wound contracting very fast, till a yellowish white substance rose up from a small peduncle at the part where the under-part of the cephalic vein had been cut through. From this substance such a quantity of lymph oozed out from imperceptible orifices, that the dressings were every day wet. I cut and eroded this substance away several times; but it quickly grew again, and the drilling of lymph became worse and worse, so that in a very little time it dropt so fast, that I could have gathered a spoonful of it in a very short time. What cured it at last was, eating the fungous stuff and a little of the wound about with powder of Roman vitriol, and dressing the eschar with alcohol, which kept it from separating two weeks, in which time the orifices of the small pipes were soldered.

2. A gentlewoman having been let blood of in the basilic vein in the country, soon perceived a tumor at the orifice. Several months after she came to town. When I saw it, it was as large as a walnut, beating violently: I could make it disappear by pressure; and as I kept my thumb on it, while I yielded to the influx of the blood, I had a feeling very like to hearing the sound of water rushing into a pipe.

I tried first what pressure would do in keeping the blood from rushing into it; but that being of no use, I was obliged to perform the operation of the aneurism, which I did in the way proposed in your 17th Art. of Vol. IV. The sac, in which nothing but liquid blood was contained, was as thick and strong as the cystis.

cystis of incysted tumors commonly are, and was evidently formed in the same way, that is, by the stretching and thickning of a part of the cellular membrane. However, I cut none of it away, on purpose to see what change would come on it. As the tumor had extended itself principally outwards, it had raised both median and cephalic vein in the teguments upon it; and the cephalic lay so obliquely over it, that I could not evite it in cutting.

I had the pleasure to see the hard firm bag become every day softer and thinner with papillæ of granulated flesh growing out from it, till it became all the same soft red flesh as was in the rest of the wound.

After a fortnight, such a yellowish white fungus, with a drilling of lymph as described in the former case, rose out from the part of the wound where the extremity of the cut vein was. I burnt it with the lunar caustic, and dressed the eschar with alcohol; which effectually cured it, and the fore was skinned fully over in some less than six weeks, and my patient enjoyed then the full use and strength of all parts of the member. The pulse at the wrist was plainly felt next day after the operation, and is now so strong that no body could know the artery was ever tied.

The operation of the aneurism has been six times more performed here; so that in few years there are nine examples of its success in this place, all the patients who underwent it having been brought from the country.

Since 1747, the operation of the aneurism has been performed here successfully on four more patients.

XXVIII. *A milky Discharge at a small Orifice in the Groin; by Mr JOHN PATCH, Surgeon in Exeter.*

**A** Son of Samuel Wroth of Crediton in the County of Devon, about eleven years of age, and of a strong and healthy constitution, complained to his mother, on the 8th of January 1739-40, that the linen in his breeches was very wet, and he knew not the reason of it; but she thinking it to be urine, was about to correct him.

About two months after, the boy made the same complaint: When she examined him, and soon found a liquid like unto milk continually issuing from a small, almost imperceptible orifice near his left groin, which continued for three days; and she verily believed, that the whole discharge at that time was not less than two quarts or five pints, which very much weakened him.

A flux of the same kind, and from the very same part, began again about six weeks after, and wept, but not continually, especially towards the latter part of the time, for near five weeks; from which, the boy lost his appetite, and was grown so weak that he was scarcely able to walk.

Being informed of so remarkable a case, about the beginning of September, my curiosity led me to have a sight of it. There being then only a little redness in the skin, about an inch above the inguinal gland, as if there had been a small pustule, without any pain,

tumor,

tumor, or inflammation, made me to suspect the truth of what I had been told concerning it. However, I ordered the boy to acquaint his parents (they being poor) that, if his disorder should return, I would readily and freely give him my utmost endeavours for his cure.

Towards the end of the month, the boy came under my care. Seeing it then perfectly sound, and of the natural colour of the skin, I did nothing for him: But, in a few days after, three or four spoonfuls of the discharge was brought to me, which appeared like scalded milk; and some of it being heated over a candle, it soon turned to a soft curd. I immediately sent for the boy, and observed it to run from the small orifice down his thigh pretty fast, but it was quite stopped next morning, when I applied a small piece of common caustic on the orifice, with proper bandage. After this application of the caustic, there was never any milky discharge. When the eschar separated, which I did not endeavour to hasten, I suffered the flesh to rise above the skin, that the cicatrix might be the stronger. The fore was afterwards skinned over with the common desiccatives, and the boy soon recovered his strength, and has continued ever since in perfect health, without this or any other complaint.

A week after the application of the caustic, I drew about eight ounces of blood from his arm; and, contrary to my expectation, found the serum as well as the coagulum to be natural both in colour and quantity.

XXIX. *A Fracture of the Skull, with Loss of Part of the Substance of the Brain; by Mr. DUNCAN BAINE, Surgeon in Pembroke.*

SEVERAL histories are recorded of people recovering after wounds of the head, where part of the substance of the brain was taken out; but so few of them are met with in the common reading of surgeons, that I imagine it would be of advantage to relate more of them, whereby surgeons might be encouraged to undertake such patients. With this view I send you the following case.

William Lloyd, eight years old, plucking hairs from a colt's tail, received a kick about an inch above the orbit of the left eye, which stunned him so much, that he was taken up for dead, bleeding at nose, ears, and mouth, and in this condition was brought two miles to town here. The wound extended to the lesser canthus of the eye. In examining it, I found a fracture of the bone, of a triangular form, three quarters of an inch long, the superior angle being depressed and somewhat loose. I made an incision cross the wound to lay the bone sufficiently bare, and, then dressing it up, let five ounces of blood at his arm, ordered an emollient clyster to be injected, which he could not retain, and sent him an antispasmodic julep, with some *pulv. de gutteta*, to be given, of which he swallowed a little now and then.

In the night-time he had three severe convulsive fits. Next morning, I saw and felt the fracture,

fracture, as above described. I fixed the screw of the trepan into the lowest, most fixed part of the fracture, and in doing this, raised the upper angle so much, that I got the end of a thin silver spatula below it, without pressing on the *dura mater*; then drawing the lower part of the bone outward with the screw, while I raised the upper part with the spatula, I took out the whole fractured piece of bone. In raising the upper angle, the boy raised his hand to the wound, and, when the bone was taken out, he made some incoherent noise, which were the first symptoms of feeling he had after receiving the blow. I cleaned away all the extraneous substances out of the wound, applied a syndon wet in *sp. v.* and melrose to the *dura mater*, and the other common dressings to the wound. In the afternoon, the clyster was again injected, and he retained it, and some time after had a large stool.

That night he had one convulsive fit. Next morning, he spoke articulately and rationally. I continued to dress him every day, and several times brought away a tea spoonful of the substance of the brain; notwithstanding which he was cured in ten weeks, and is now a stout lusty youth at service in the country, with indeed a large scar in his face, but with all his senses and strength good and entire.

XXX. *Artificial Passages for natural Liquors made by* ALEXANDER MONRO, P. A.

TO keep the promise I made in Art. xiii. of your second volume, I send you the three following cases. A

A gentleman had been plagued with a tedious tooth-ach, which occasioned a very hard tumor above the joining of the cheek and gums of the second *dens molaris* in the upper jaw on the left side. The tumor having suppurated, broke outwardly on his cheek; the matter flowing out of the ulcer was for some time very foetid, and several carious pieces of bone came out of it. This ulcer continuing long, the patient came to this place with Dr Hugh Sutherland now physician in Orkney.

There was then in the ulcer a tent about the size of goose quill, an inch and an half long; when the tent was taken out, it was covered with purulent like matter; but, upon leaning his head forward and to the left side, a clear liquor resembling glairy spittle dropped out. No such liquor or pus had ever run out of his nose upon reclining his head to the right side and downwards. The fore had no foetid offensive smell. A probe gently bended being put into the fore, was turned in different directions in a large cavity formed of bone lined with a smooth tense membrane which covered the bone every where that we applied the point of the probe. The roots of the rotten tooth, which began this trouble, and had often been attempted to be drawn by different tooth-drawers, were still fast in their sockets. Dr Sutherland and the patient both informed me that they had several times observed a thickness, and felt what they thought to be a fluctuation of liquor in the palate or roof of the mouth, which there was not then any.

any appearance of. The patient was otherwise in good health.

By cutting the gum between the roots of the rotten tooth, I made way for a thin piece of iron, which I pushed forcibly in between these roots, and then thrusting it to a side, I prised the one root inwards out of its socket, and made the other so loose that it came afterwards easily out. A small gimblet being immediately put into the farthest back socket, I endeavoured to make it pierce into the *antrum maxillare*, but could not direct it so far back. To give a discharge of the mucus into the mouth, and to prevent its running out at the orifice in his cheek, till the swelling of the palate should give an opportunity of making a more effectual drain, I laid aside the tent, and pushing a shoemaker's awl from the joining of the gums and cheek into the sinuous ulcer near the aperture made into the antrum, by the former caries, by the means of a very flexible probe, I introduced a small cord into the wound made with the awl, and brought an end of it out at the external orifice of the ulcer, desiring the mouth to be frequently rinsed with brandy to render the new wound callous soon.

The patient's business obliging him to return home, he went away with this seton, which being taken out some time after, this new passage shut up as well as the external orifice; soon after which the palate swelled, and being opened by Dr Sutherland, some small pieces of bone came out, and our patient has been well ever since.

*Hist.*

*Hist.* 2. In consequence of a tooth-ach and rotten root, a tumor rose in a young gentleman's cheek, which had been opened in the inside of his mouth, and a glairy clear matter was evacuated; but the incision closing soon, the tumor again appeared, and when I first saw him, was as large as a small golf-ball, filling all the hollow of the cheek, and being considerably prominent. I judged it to be of the incysted kind, forced out the remains of the rotten tooth; but the tumor not evacuating at the sockets, Mr John Douglas, at my desire, opened it with a lancet within his cheek. Clear mucus being pressed out at the orifice, the tumor subsided, when we plainly felt three exostoses pointing towards each other, between which the sac had been nitched. One of the exostoses rose from the root of the nasal process of the maxillary bone. The second grew out from that same process, or from the anterior orbital process of the *os malarum* near to the orbit. And the third, which was the largest, resembling, when felt through the teguments, an old cock's spur, rose out of the cheek-bone. We could be sensible of no bone being bare or spoilt by a probe introduced at the wound, nor had we reason, from the nature of the matter evacuated, to judge that there was any carious bone. A tent with a thread hanging to it was put into the wound, which was continued some weeks, brandy and melrose being frequently injected into the empty cyst, and the patient rinsing that side of the mouth often with brandy. After we thought the passage callous, the tent was no more used.

and the patient has had no return of the tumor.

*Hist.* 3. Upon drawing the roots of a rotten tooth of a young lady who had a tumor resembling the one described in the former history, a yellowish-coloured thin liquor flowed out of one of the sockets; this liquor had a great many particles resembling oil swimming on its top, but had no foetid smell. The swelling immediately subsided, no exostosis was felt; a small probe introduced into the hole of the socket could not be made to touch any bare bone in the circumference of a large cavity it was put into; nor could we discover the passage by which the liquor came from the external cystis into the socket of the tooth. The management of this case was the same as of the preceeding; the oily particles appeared several days in the liquor that flowed when the tent was taken out; at length they could not be observed. The lady has continued well and free of swelling.

XXXI. *An uncommon Tumor of the Neck extirpated; by Dr THOMAS SIMPSON, Professor of Medicine in the University of St Andrew's.*

A Farmer's wife in this country, after being bled nine years ago in the jugular vein, found a small tumor forming about the place of the incision, which increased to the bulk of her two fists. It broke upwards of a year ago, ulcerated, and ran a great deal of stinking sanies: The smell, which the strongest

spirits could not correct, was so offensive to her, that she was perpetually uneasy, sick, and faintish.

When I saw this ulcerated tumor, it sunk deep into the fossa on the right side of the *aspera arteria*: So that, knowing its base must be very near to the carotid artery and internal jugular vein, I was unwilling to undertake the extirpation of it; but was afterwards prevailed on to perform the operation, as being the only chance the woman had for life.

In dissecting out this tumor, I laid the carotid artery bare for about two inches, and plainly saw its pulsation: As it sends out no branches about this part of the neck, I wrought with the greater resolution. From the upper part of the tumor a cartilaginous process went to the larynx, to which it was strongly attached. In cutting this away, there was a strong jet of blood from an artery, which soon stopped after the application of spirit of wine to it; so that I went on with the dissection of the tumor from the vein downwards. After laying the vein bare a considerable way, I found it confounded at the lower part with the substance of the tumor; and therefore, putting a ligature round the vein, I tied it, and then cut away the remaining part of the tumor below, except a small part, in which I thought the vein was involved, expecting the ligature would make this fall off: But, seeing no appearance of such a separation after eight days, I cut it through immediately below the ligature, and found vein and all quite solid, of a cartilaginous firmness. After this hard substance

was

was all taken away, the large cavity, where the tumor had been lodged, filled up very fast; so that the wound was cicatrized in six weeks.

What are to become of a great many small knots which formed in each side from time to time, after the large tumor increased, I cannot yet determine.

XXXII. *Histories of Collections of bloody Lymph in cancerous Breasts; by ALEXANDER MONRO, P. A.*

NO mention being generally made by chirurgical writers of a collection of bloody lymph in the breasts of women, as a consequence or attendant of the scirrhus or cancerous tumors of those glandular parts, I send you the following histories of such cases, which may at least teach practisers to know when they meet with such a disease, and may save them from being accused of destroying their patients by their ignorance.

I. A woman about fifty years of age shewed me her right breast, in the exterior side of which there was a large very hard unequal tumor, in which there frequently was sharp pain. In the hollow of the arm-pit was such another hard tumor: Both of them had increased very slowly.

I ordered her to be let blood of, to take a cooling purgative ptizan once a week, and to live on a spare cooling diet, which soon made the pains easier. Some people however having promised to make a compleat cure of her breast, prevailed on her to apply warm suppurative cataplasms to her breast; which brought

a fluctuation of liquor that was believed to be a compleat suppuration, till it broke, when, as the woman and her relations informed me, about four pound of bloody water ran out : After which the woman was in constant violent racking pain, which made her again desire me to visit her. Near the arm-pit, there was then an orifice which could admit three fingers at once, that was the entry to a very large hollow ulcer, from which there was a constant discharge of abominably stinking watery sanies. Upon pressing the sac, I made several spoonfuls of this liquor to run out. The woman was so weak she could not turn herself in her bed, to which she was confined; her pulse was very quick and low; she had a diarrhoea, night-sweats, and cough, and was kept constantly awake by the sharp pains of the sore.

To make her somewhat easier the short time she had to live, I made tepid rose-water with a little vinegar, brandy, and liquid laudanum, to be injected into the sac frequently; and gave her a cordial julep, with some laudanum, to be taken sometimes: By which the pain was blunted during the two days more she lived.

II. My advice was asked for a middle-aged woman living in the country, who had been two years sensible of a hard tumor in the upper part of her left breast, which was very small in the beginning, but was increased gradually to a great bulk, notwithstanding different medicines she had taken, and the application of mercurial and gummous plasters, &c. The cutaneous veins of this breast were turgid; the skin was become red; lancinating pains

often pierced through the tumor, which was very hard. At the time of the menstrual evacuation, the tumor became so large as to appear to be fixed to the ribs, upon plentiful blood-letting subsided, and was again moveable.

My opinion was, that either the breast should be extirpated; or, if that was not consented to, by general evacuations and a low diet, the increase of the tumor should be retarded; and by a cooling lotion, such as *acet. lethargyr.* diluted with water, the inflammation of the skin should be prevented.

Some time after, my correspondent wrote to me, that the tumor had suddenly increased to a very great bulk, with an increase of the pain; that it then became soft in some parts, with a fluctuation of liquor, while the hard tubercles were felt at other parts; that at length the whole tumor became red, soft, and full of liquor, and had been opened at the lower part, when two pounds of a bloody water, which had no smell, were evacuated.

Next day the pain was much more violent than formerly; the wound had a cadaverous smell, and the superior part of the breast was still turgid with liquor: To evacuate which, another incision was made; and, four pounds of the bloody water being let out, the breast became very flaccid. The pain increased violently, a gangrene appeared on all the skin of the breast, and next morning their patient died.

When the breast was dissected afterwards, it was found to be an empty bag without any tumefied gland in it.

III. A middle-aged woman, mother of several

veral children, who had always been of a weak habit, and subject to nervous disorders, having accidentally bruised her right breast slightly, felt soon after a hard tubercle toward the exterior side of that breast, which, notwithstanding some purgatives and aperient decoctions that were given to her, increased considerably. She was with child when I first saw her along with several other gentlemen, who thought the extirpation proper: But her condition prevented its then being performed, and gentle deobstruents, with mild food, were recommended.

The tumor grew bigger, a small hard knot formed below the edge of the pectoral muscle, and the axillary glands tumefied and became hard.

She aborted in the sixth month of her pregnancy, and had a very plentiful discharge of lochia, but without any change being made on the tumors. As soon as she had recovered from the abortion, she took rhubarb and other mild purgatives frequently; her menses returned in sufficient quantity at the regular periods: She was more free of the nervous disorders than she had been for a considerable time; the tumors however in her breast and arm-pit increased fast.

After the whole breast seemed to be scirrhous, a fluctuation of liquor was perceived in several places toward the exterior and superior part of the tumor, and she complained of pricking pains in it. Soon after the breast swelled fast, the fluctuation was felt every where in it, and the veins of the skin became very large and varicous, the uneasiness from the weight and pain keeping the patient almost entirely from sleep.

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The teguments at last turning red, pointing, and so thin that they would soon have been opened by the liquor, a very small lancet was pushed into a depending part of it free from large veins, and three pounds of a blackish red lymph were allowed to run out; and the further evacuation at that time was prevented by a tent adapted to the small orifice, secured by a piece of adhesive plaster.

The liquor which was drawn off had no smell; and, when exposed to heat, coagulated as the serum of the blood does.

The patient bore the evacuation well, and was easier than ordinary all day.

Next morning, when the dressings were removed, the skin appeared of a natural colour, and the veins were all contracted; a pound of the same sort of bloody lymph flowed out of the wound. After which the glandular part in the middle of that breast could be distinctly felt, and did not seem larger than the glandular part of the other breast; but the tubercle at the edge of the pectoral muscle, and the hardened axillary glands, were as large as ever.

After the second dressing, the patient complained of a sharp pain near to the wound; which being suspected to be occasioned by the point of the tent touching some of the glandular parts, now when the breast was collapsed, it was changed for one no longer than would go no deeper than the thickness of the lips of the wound.

Between this third and the fourth dressing, the lymph oozed at the sides of the tent, and had somewhat of a putrid smell.

On the fourth day after the opening, the teguments

guments were so thin as to allow the original tumor in the exterior part of the breast to be distinctly felt; and it seemed rather larger than when it began to be concealed by the collection of lymph.

On the fifth and sixth day, there was little change; only the lymph became more foetid, and more of an ashy colour.

Seventh, the large tumour of the breast felt softer.

Eighth, the quantity of lymph was less, and some tolerably good pus came out upon the tent. The smell and constant oozing of the lymph being uneasy to the patient, a sponge dipt in *Aq. Calc.* and *Aq. Regin. Hungar.* and afterwards pressed near dry, was laid over the breast.

During the eleven following days the appearances mended; for the quantity of liquor flowing by the orifice decreased, its smell became less foetid, and its consistence was nearer to that of pus; at the same time the large tumor became less and softer.

Afterwards frequent suppurations came on in different parts of the teguments: The glandular tumor increasing, the pain deprived the patient of sleep, and, with the evacuation, wasted her, took away her appetite, made her gradually weaker; so that, after suffering all the uneasiness which commonly attends ulcerated cancers, two months more, she died.

IV. A woman who had born several children, being again with child in 1733, the 37<sup>th</sup> of her age, observed the nipple of her right breast drawn inwards, so that, when she was  
The

brought to bed, the child could not catch hold of it to suck it.

When this child was a year old, the mother was suddenly frightened when her menses were on her; which put them away, and she never after had any return of them.

In March 1739, she recovered from a dangerous fever; soon after which, she was exposed to cold, and was violently in wrath, fear, and grief, receiving at the same time a bruise on her right breast. This shock confined her to her bed, three months; and soon after it, she perceived a small painful red tumor in the inferior exterior part of the right breast, which she neglected.

In the end of July 1740, when I saw her first, the right breast was very large and hard, with such sharp pain that she slept none; the veins of the skin were varicous, and the nipple was shrunk out of sight; I however felt a fluctuation in it, and judged it to be such a case as the preceeding.

Next day, July 31st, I made a young gentleman, my pupil, put a small lancet in the inferior anterior part, where it was thinnest and most prominent: He let out eight ounces of a bloody lymph, without smell, but salt when tasted; which, held in a spoon over a candle, coagulated. A very short tent was put into the orifice, secured from going into the cavity by a thread, and hindered to come out by adhesive plaster. She slept better that night, having less pain.

August 1st, Four ounces of the same sort of lymph ran out, the tumor was less, the skin was

was of a natural colour, and the veins were contracted. A little lime-water and melrose were injected tepid into the cavity of the ulcer.

August 3d, Two ounces and an half of liquor ran out of the sore: This liquor was more of a purple colour, and less salt to the taste. It was dressed as formerly.

4th, The tumor felt as if divided in the middle, and as if it were falling to pieces; her appetite was better, the pain less, an ounce of liquor ran out; the dressings the same.

5th, She underwent what the women call a weed, which resembles the paroxysm of an ague. This day the liquor evacuated at the sore was in greater quantity, thinner, darker coloured, more foetid, and, when held in a spoon over a candle, did not coagulate. By drinking plentifully of thin warm liquor, she had a profuse sweat which carried off the weed.

6th, The tumor was harder, the pain greater, the liquor foetid; a little digestive was added to the injection.

Two months, attempts were made to melt down the hardness; but so unsuccessfully, that it increased, became more painful, and wasted her: Yet she absolutely all the while refused to let it be cut off. Her left breast then inflamed, was soon brought to suppuration by proper applications, and cured in few days.

Soon after, five small tubercles were observed in the right arm-pit; which disappeared in a few days, upon a fungous excrescence thrusting out at the orifice in the breast of the same side, and some long tough substances coming out with the matter.

Some days after, a soft equal tumor, about the size of a large nutmeg, without pain or discolouring, started up at the interior side of the affected breast, the fungus in the orifice having retired at the same time, and the lips retorting, with all the very bad symptoms of an ulcerated cancer; which in a short time made her so miserable, that she was content to submit to the amputation of the breast; which was done successfully by the same young gentleman, who, under my directions, had taken care of her from the beginning.

Some months after the wound was firmly cicatrized, and she strong and well, some knots began to appear in the arm-pit, and at the edge of the pectoral muscle: She was frightened for more cutting, and let them increase and spread, till now she seems to be in the way of suffering all the miseries of a cancer that cannot be taken away. My prognostic was too much verified in this patient.

The quick return of the cancrous knots, after the extirpation of the breast in this case, calls to my remembrance a problem which I have often wished to have a solution of, Whether ought cancrous tumors to be extirpated, or ought the palliative method only to be followed, when they cannot be resolved?

The resolution of a cancer I acknowledge to be very rare; but having seen two such tumors, or at least what I judged to be such, cured, I would not exclude the supposition altogether.

To encourage others to tell their experience and opinion, I shall give you mine.

Of near sixty cancers, which I have been present at the extirpation of, only four patients remained free of the disease for two years. Three of these lucky people had occult cancers in the breasts, and the fourth had an ulcerated cancer of the lip.

The disease does not return always to the part where the former tumor was taken away, but more frequently in the neighbourhood, and sometimes at a considerable distance.

Upon a relapse, the disease in those I saw was more violent, and made a much quicker progress than it did in others to whom no operation had been performed.

When an ulcerated cancer, that can be extirpated, is wasting the patient so fast that it must bring death in a short time, there seems little doubt, that it ought to be taken away, as the only means of prolonging life.

If an occult cancer is occasioned to a young healthy person by a bruise or such other external cause, the hope of escaping a relapse would persuade us to extirpate it.

In all other cancerous cases, the earnest entreaty of the patients who have had the danger of a relapse fairly explained to them, and not the surgeon's persuasions, should make the extirpation be undertaken.

My practice since the former editions continues to confirm what I have here said concerning the frequent return of cancers, notwithstanding many attempts of different kinds to prevent it. Courses of mercury, drinking the decoction of guajac, aperient roots, millepedes, and such other attenuants and deobstru-

ents, did no good. What did, most service, was the keeping a part of the wound, made in the extirpation, open in the form of a perpetual issue; which retarded the return so long in some patients, that I flattered myself I had at last hit on the preservative against a relapse. But even in this I have been disappointed.

Since the former edition of this volume, I have seen many cancers return after extirpation, and very few that did not return, notwithstanding the use of *mercury*, *guaiac*, *millepedes*, *verruca equina*, and a variety of other medicines, which were given with a design of freeing the blood of the cancerous matter. One woman who had a large cancerous, mamma extirpated, had part of the wound kept open in form of a perpetual issue, and remained long without a relapse, which made me hope such drains would be preservatives against a return of scirrhus tumors; but they have failed in several other cases.—Sea-water taken frequently in such quantity as to purge gently is said to have dissolved scirrhus tumors; but I don't know that sufficient trials of it have yet been made.

XXXIII. *The History of an extraordinary Empyema; by Mr JAMES JAMIESON, Surgeon in Kelfo.*

IN January 1725, the wife of one William Turnet in Sproustoun, of mean circumstances, but a woman remarkable for strength and vigour, fell upon a stone, that struck her immediately under the right scapula, and com-

plained for about four months thereafter of pains not only upon the part struck, but internally through the whole thorax; notwithstanding which she went still about her ordinary affairs. About the middle of the fifth month after the fall, her pains increased to that degree, that she was reduced to lie a bed, and a little small white tumor appeared where she first received the stroke, which very gradually increased till the beginning of September, when I was first sent for, and found her in the following deplorable state, viz. with a violent internal pain through the whole thorax, a great difficulty of respiration, a constant diarrhœa attended with a tenesmus, frequent colliquative sweatings, great drought, and her pulse hectic, and she was about four months pregnant. The tumor was increased to the bigness of a child's head, was very hard, and of the same colour with the rest of her skin, which obliged her to sit night and day in a bended posture. In this condition she was seen some days before by a physician and surgeon of this place, who both declined meddling with her, fearing immediate death from any operation for her relief; which at my first visit I declined as much as they, from the same fears; but, being again solicited in the most ardent manner by the friends and relations, and by the patient, to relieve her of exquisite torture, though at the risk of her life, I was prevailed upon to make the operation.

After having prepared some dossils and pledges of dry lint, compresses, napkin, and scapular, I plunged a large dissecting scalpel into the

the center of the tumor some inches deep before I reached the matter which flowed from the wound, though very large, with the impetus of a new tapped cask, till a vessel, holding a Scots pint, was full in about two minutes or thereby. The velocity of egress still continuing, I durst allow no greater discharge for that time, fearing a leipothymia or worse, so dressed up the wound with the apparatus aforementioned, gave her some spoonfuls of a cordial and anodyne mixture, ordered a decoction of the woods with raisins and a little of the *cortex peruvianus* acidulated with a little of the *succus limonum*, for ordinary drink, and Panado's gruels, or such like, with a little white-wine, for food.

Next day I visited her, when she told me the pains were not altogether so intolerable, and she had slept more that night than for many preceeding. I likewise viewed her stools kept on purpose, and found them very much mixed with pus of the same colour and consistence, which was white and well digested, as that which came from the wound. I likewise examined her urine, the sediment whereof was of the same nature. When the dressings were removed, the pus issued out with the same force and to the same quantity as the first day, the tumor continuing notwithstanding *in statu quo prius*, which I dressed up as formerly, with only the addition of an emollient and discutient cataplasm.

At the third visit, I found her pulse neither so frequent nor depressed as formerly, her respiration

piration was less difficult, and all the other symptoms less threatening. She had slept tolerably through the night, though still in a sedentary way, being unable to suffer any other posture. The dressings being removed, the matter spontaneously flowed to the same quantity of a pint, or four pound, but not with the same force as the two preceeding days. It was still laudable, and only at this dressing could I observe the tumor yield in its magnitude. It was now considerably lessened, so that, by introducing my finger, I felt a pretty large opening betwixt the seventh and eighth true ribs. She was this day dressed, and every thing continued as the day preceeding.

At my fourth visit, every symptom appeared more favourable; and, upon removing the dressings, I found the tumor much decreased, but the quantity of matter was notwithstanding as much at this as any of the three foregoing dressings, only towards the latter end of its egress it drilled down her back, and appeared to be much exhausted. I now dressed with the common digestive mixed with a little *bals. peruvian.* and the compresses wet in brandy. This night was the first of her lying down with the orifice always most depending, to encourage a free egress of the matter.

On the fifth day, I found her chearful, she had slept well through the night, her pulse was free, with very little frequency, and every other symptom agreed therewith, except the diarrhoea, which still continued, though not so much attended with the tenesmus, nor were her stools

stools and urine so purulent as formerly. I found the dressings and bed-cloths all soaked with matter, but when removed there was a very small spontaneous discharge from the orifice; so I dressed it as formerly.

On the sixth day, I found her very feeble, dispirited, and in a most languishing condition, from an abortion which happened that morning. She had a coldness and rigidity in her limbs, frequent faintings attended with some slight rigors, notwithstanding which the lochia continued to flow, though in a small quantity. I now gave her frequently a little warm sack-whey, with some gutts of the *tinct. castor. croc. and spir. salin. arom.* mixed together, whereby she recovered her strength and spirits daily, every thing else answering to our wishes; so that, in ten days after, she was able to quit the bed and sit some hours upon a chair. From this time till the cure was completed, one of my apprentices dressed her once in two days, and I visited her once, or at most twice, in the week for about eight weeks, when a firm cicatrice was procured, after a small exfoliation from one or both of the ribs. She has continued ever since free of all complaints except an ague, and has born three children.

XXXIV. *A considerable Share of the Intestines cut off after a Mortification in a Hernia, and cured by Mr WILLIAM COOKESLEY, Surgeon in Crediton.*

Sir,

**A** Braham Pike of Crediton, in the county of Devon, chimney-sweeper, aged about thirty,

ty, had laboured under an *hernia intestinalis* for several years, which in the beginning of September 1732 was increased to such a degree, by overheaving himself in carrying water to help to extinguish a fire that happened in the neighbourhood, that he could not reduce it as usual when in bed. This misfortune was immediately aggravated by a total strangulation of the intestine. The poor man, through ignorance and want, suffered terrible pains in the part for about a fortnight, without acquainting any body with his late misfortune besides his wife; till, grown at last intolerable, Dr Bent, passing accidentally by, was desired to cast an eye upon him; who finding the tumor large, with great inflammation tending to a livid colour, advised them to get a surgeon, whose business it was, and in the interim to apply a warm emollient cataplasm to it; which was accordingly done.

I was sent for the next morning, and upon examination found the matter had penetrated the coats of the scrotum, discharging itself in great quantity, with putrid sloughs filling up the whole cavity, the greater part of which I cut off with my scissars, contenting myself for that time to dress it up with a warm digestive, till I could provide myself with a fomentation and other necessaries, as the case required.

At the next dressing I found his excrements, which he had not discharged the natural way for above a fortnight before, came off at the orifice in a large quantity.

The

The whole cavity of the wound, which was very large, was a confusion of matter, excrement, rotten gut, and mortified membranes.

I cut off at that time above six inches of the intestine, (all of which being fallen down into the scrotum was entirely sphacelated) as also above half the right side of the scrotum. Having washed off the remaining fordes with some of the fomentation I had hot by me, I dressed it up with pledgets spread with a digestive, and dipt in the same liquor. This, nor any of the succeeding dressings, was attended with the least haemorrhage, so that I suppose the spermatic vessels and the testicle were likewise mortified; for I could find neither of these upon cleansing away the stinking sloughs that covered them, and I believe they came off together with those sloughs, but in so rotten a state that they could not be distinguished one from another.

I continued on dressing it twice a day; the remaining sloughs digested off, and the wound began to clean and look well; but still the excrement, which should have been discharged by the anus, came off at the new passage: And how indeed could we conceive it should do otherwise, when so much of the whole annular substance of the gut had been cut off?

Though I had always despaired of the life of my patient, yet knowing nature sometimes brings about her ends in a miraculous manner, I was resolved to assist to the utmost of my power. I ordered frequent clysters to be injected, which brought away the indurated fœces, that had lain

a long while in the rectum, and by continuing this method for some time, the discharge from the wound every day lessened, and he had frequent stools from the natural passage. Thus our cure went hopefully on, and, after above a month's obstruction from his first confinement, nature returned again into its former channel. The discharge at the new one gradually lessening, till at last it perfectly stopt; the ulcer was incarned and cicatrized with very little trouble, and the cure compleatly finished without any further obstacle.

As the man is cured of his hernia, he is now in a much better condition than he was before this accident happened. He has been very healthy since that time, and follows his labour: He is grown fat, and looks better than he did years before.

Thus, Sir, I have given you a full account of this extraordinary case; a parallel to which I had not met with, nor read of, till I lately saw something like it in the Medical Essays. I hope it will meet with your approbation, the rather because you know the greatest part of the relation to be true; you having seen it at first yourself, and had a constant account of the patient during the whole procedure from,

Sir,

*Crediton,  
Dec. 8. 1738.*

Your most obliged  
humble Servant,  
WM. COOKESLEY.

*To Dr Bent at Exeter.*

I lived at Crediton when the accident happened; and, as I remember the case very well, am satisfied it is fairly stated.

GEO. BENT.

XXXV. *The History of Plum and Cherry Stones evacuated at an Abscess in the Belly; by Mr JOSIAH COLE, Accoucheur, London.*

**B. C.** Eighteen years of age, after being two years disordered with a straitness of breath, hectic fever, &c. complained of a pain in the right side of his abdomen about the middle of May 1739. This pain was attended with a strait breath, reaching to vomit, and fever, and a tumor soon appeared to the right side of the navel, which suppurated and was opened June 6th. Well concocted pus was first discharged at the orifice; but afterwards, by pressing the parts, a thin matter of a very foetid nature followed. His breath soon grew better; but so much gleety matter was discharged from the wound, that it was obliged to be dressed several times a-day; and he became very tabid and hectic, and complained of great pain in his belly.

About three weeks after, opening the tumor, I observed the dressing stained with a thin excrement, which has continued to discharge that way ever since. When he was costive, which he frequently was, sometimes he had no stool for a week: The discharge of excrement from the fore was very large, and in it he observed the seeds of gooseberries, the stones  
of

of raisins, &c. which he had eat some hours before.

December 13th, The pains of his belly were greater, with violent prickings near the wound, and very little discharge from it through that day: But in the evening the stone of a damask prune came away, with a very great discharge of excrement at the wound; since which, at times, twenty cherries and damason stones have come away, tho' he declares that he had eat neither damasons nor cherries for two years past.

Mr Serjeant Amyand having visited him, discovered a sinus, which he opened, to allow a more free discharge of those stones and of the excrement. Some more stones came away, and our patient's ill symptoms left him; till the wound becoming fungous, Mr Amyand sprinkled red precipitate on it one day, and rubbed the lunar caustic on it next day: After which he complained of violent pain in the fore and belly, with a smart fever from four o'clock in the morning till ten at night, when he was relieved by sweating. Next day the fever returned, and went off also with a sweet, but without any lateritious sediment in his urine. I then gave him two scruples of the bark every three hours, which prevented any return of the fever next day. He had the powder of the bark every sixth hour of the day following. While he was taking the bark, I saw the powder of it on the dressings. When he omitted to take the bark the third day, the fever returned: Which made me keep him constantly

constantly in the use of the bark for several weeks, since which he has recovered, and at present (June 1741) in his perfect health and robust; only the orifice in the gut remains open, thro' which it continues to discharge its contents. He has stools in the natural way, but very seldom; and, having a good appetite, discharges a great deal through that opening in his belly.

XXXVI. *The History of a Glans Penis regenerated after Amputation; by Mr JAMES JAMIESON, Surgeon in Kelso.*

IN December 1736, a young man about 19 or 20 years old, who had been six or seven weeks under cure of a gonorrhœa, came to Kelso and asked my advice. Upon viewing the parts, I found a gangrene on the præputium and balanus; the whole penis was inflamed, and swelled so greatly as to be threatned with the same fate, attended with most acute pain and a stillieidium from the urethra of an ichorus and foetid matter, attended with a full, hard, and frequent pulse: Whereupon I desired him immediately to consult a physician, as no time was to be lost; and accordingly the ingenious Dr Gibson was called.

We then reviewed the parts affected, and agreed to try by incisions how far the gangrene had gone; whereby we discovered, that both the præputium and glans were irretrievably mortified, and that nothing but extirpation could give the patient the smallest chance for life, therefore

fore instantly determined to do the operation, and I amputated all the parts affected, viz. the balanus, præputium, with a small portion of the *corpora cavernosa penis*.

As the hæmorrhage was but inconsiderable, we dressed the stump with dry lint: Then applied a bandage and suspensory, took near a pound of blood from his arm, laid him in bed, and gave him an anodyne; whereby he slept well through the night, and was much refreshed.

Next morning, the fever was much abated, and the pains were less severe; but the drought rather increased, and his belly was costive. We bled him again, and threw up an injection; then gave him a lenitive ptizan to drink through the day with some doses of the *lapis prunellæ*, and repeated the anodyne at night. All the medicines performed to our wish.

The third morning, he was much easier of the pains, and his pulse less frequent: But still a little too hard, for which he was bled a third time, and got the anodyne at night. His greatest complaints were now a smarting of his thighs, scrotum and perinæum, occasioned, as we found next day, by the diffused urine and matter of the gonorrhœa that had excoriated these parts, and proved very uneasy to him for several days; which was cured by bathing with warm milk, and the *unguentum saturni* spread upon linen cloths that were kept on the parts, after being well dried, to prevent the like consequence.

On

On the fourth day, we removed the dressings, and found the parts look fresh and well, the digestion begun, and the pus of a mild aspect from the stump: But the colour and consistence of the gonorrhœa shewed a great degree of virulency, and gave trouble to the patient by the *ardor urinae*; both which were removed by several doses of calomel, gentle purgatives, laxative decoctions, cooling diuretics, and at last was totally cured by proper balsamics. The penis was this day dressed with lint as before.

Upon the sixth day, we again removed the dressings, upon account of a very large discharge of matter that was still good; but a fungus appeared to be growing fast, which we endeavoured to suppress by the lunar caustic: But such was the consequence of the first trial, that, by the sharp pain it occasioned, his fever returned, and continued about 24 hours, and was carried off by further bleeding and an injection, anodyne medicines, proper diet, and plenty of cooling and diluting drink, such as whey and barley-water, with the juice of lemons.

At the next dressing, which was on the ninth day, we tried a little red precipitate in fine powder mixed with the *linimentum Arcaei*; which also created so acute pains, that he was not able to bear it, and obliged us to renew the dressings in less than an hour after application: However we again tried both in the gentlest way; but were obliged to quit them, and take to the dry lint again, as the *dernier resort*, and the only application he could suffer,

which was continued without any alteration, till the cure was completed unexpectedly in the following manner :

The fungus to appearance still advancing and projecting forward in a direct line gave us much uneasiness, in expectation it would at last obstruct the discharge of urine, and oblige a second amputation : But, to our great satisfaction, as well as surprise, we discovered, about the sixteenth day after the operation, a thin skin begin to advance upon the part of the fungus next to the penis ; and every dressing we observed its procedure, till by very slow degrees the whole was covered, and formed a well shaped and proportioned glans, with this difference only from the natural, that the orifice of the urethra is a little larger.

The young man was married in this country about two years after the cure, has had two children, and complains not either of want or defect, even in sensation : And, as the case is quite new to me, either from practice or reading, I send it to be put in the Essays, if worthy of a place in that collection.

XXXVII. *An extraordinary Tumor impeding the Birth of a Child; by Mr JOHN GEMMIL, Surgeon in Irvine.*

**I**N the year 1731, I was called to a woman in labour, whose child was born as far as the *ossa innominata*, in which condition it had been four hours, a midwife endeavouring all she could in the mean time to bring it away.

I easily could put my fingers round the child as far as the head of the femur ; but by no means could deliver the woman, till, pushing my hand between the child's thighs, I felt something adhering to the child, through which I thrust my finger, and immediately a considerable quantity of water rushed out, after which there was no difficulty in bringing the child away.

What I had pierced with my finger proved to be a bag, larger than the child, which was of an ordinary size, formed by the skin from the *os pubis* all round the anus. This tumor was of the shape of a pear, the smaller part of it coming out from the vulva and anus. When I opened it, it was all composed of membranous divisions full of water, which were disposed in such a way as to make it resemble an orange or limon ; in the middle of it there was a hard fleshy substance.

The women present prevented my examining any further.

XXXVIII. *The Cæsarean Operation done with Success by a Midwife ; by Mr DUNCAN STEWART, Surgeon in Dungannon, in the County of Tyrone, Ireland.*

THE histories of the cæsarean operation being so few, I send you the following :

Alice O Neal, aged about 33 years, wife to a poor farmer near Charlemont, and mother of several children, in January 1738-9 took

her labour-pains; but could not be delivered of her child by several women who attempted it. She remained in this condition twelve days; the child was judged to be dead after the third day. Mary Donally, an illiterate woman, but eminent among the common people for extracting dead births, being then called, tried also to deliver her in the common way: And her attempts not succeeding, performed the caesarean operation, by cutting with a razor, first the containing parts of the abdomen, and then the uterus; at the aperture of which she took out the child and secundines. The upper part of the incision was an inch higher, and to a side of the navel, and was continued about six inches downwards in the middle betwixt the right *os ilium* and the *linea alba*. She held the lips of the wound together with her hand, till one went a mile and returned with silk and the common needles which taylors use: With these she joined the lips in the manner of the stitch employed ordinarily for the hare-lip, and dressed the wound with whites of eggs, as she told me some days after, when, led by curiosity, I visited the poor woman who had undergone the operation. The cure was completed with salves of the midwife's own compounding.

In about twenty seven days, the patient was able to walk a mile on foot, and came to me in a farmer's house, where she shewed me the wound covered with a cicatrice; but she complained of her belly hanging outwards on the right-side, where I observed a tumor as large

as a child's head ; and she was distressed with the *fluor albus*, for which I gave her some medicines, and advised her to drink the decoctions of the vulnerary plants, and to support the side of her belly with a bandage. The patient has enjoyed very good health ever since, manages her family-affairs, and has frequently walked to market in this town, which is six miles distance from her own house.

**XXXIX.** *The History of one Child extracted by an Opening in the Abdomen, and part of another passed by Stool ; by Dr GABRIEL KING, Physician at Armagh, Ireland.*

**T**HE wife of a farmer near Aughar, fifteen miles distance from this town, who had born some children, believed herself again with child in 1726. During the greatest part of the nine months of her pregnancy, she was very sickly, but the labour pains did not come till her reckoning was out, at which time she had such midwives with her as the country affords ; who, after endeavouring all they could, left her, and concluded that she had no child to bear : The swelling of her belly diminished, and she became able to go about her ordinary business, though frequently she was sick and pained for about six years, when she again conceived. At the end of eight months according to her reckoning, she felt extraordinary pain in the anterior part of her belly, and in few days a small ulcer broke out below her navel ; in some days more the elbow of a child

child appeared at this orifice ; she brought out the whole arm with her bodkin, and got it cut off, but continued in great misery some days longer, till a footman to a gentleman in the neighbourhood, and her relation, had the courage to pull out the remaining body of the child ; which two gentlemen, who went immediately afterwards to the place, and saw the child and cavity from which it was brought, assured me it was a full and compleat child, except the arm which had been taken away before.

When I went about three weeks after to see this poor woman, she was extremely emaciated, and the wound was almost closed. Upon pressing at a little distance towards the left side, from where the wound was, I felt small bones under my fingers, which seemed to be contained in a bag so thin that I am persuaded it might have been cut when the other child was extracted, and these bones might have been brought out at the same orifice. She shewed me several decayed bones, which had evidently belonged to a human foetus, that she had passed, partly by stool, and partly with her urine, as she informed me, and they were then daily coming thus away.

I believed she would die after several visits ; but in some time I found her walking out in the fields, and she has lived seven years since, her viscera falling often out at the old wound ; nor dares she keep them in by a broad canvass, belt, as I advised her, because, when troubled with wind, which she is very frequently, from, I suppose, her diet of potatoes and such like,

the pain becomes intolerable when the guts have not their liberty. Some months ago, I reduced the intestines for her, when they had come out so as to form a monstrous hernial tumor.

These two children may, I think, be judged to have both been extra-uterine: That which was brought away by the footman I take to have been the one she last conceived, and that the other had been mostly consumed or melted down by putrefaction or suppuration during the six years it remained in her belly, so that only the firmer bones remained in a solid state.

There is another woman living within five miles of this place, from whom a midwife took a child, by the cæsarean operation, near two years ago. I saw the poor woman soon after, and drew out the needles which the midwife had left to keep the lips of the wound together. I perceived the muscles contracted into a lump at the lower part of the belly; which increased, and at last broke and run considerably. This woman is capable of doing something for her family, with the assistance of a large bandage, which keeps in her intestines.

This child, which I saw, was not extra-uterine; for severals beside the midwife assured me, that a leg of it presented itself to view in the vagina before the operation.

*Armagh, 23d Oct.*

1740.

*By comparing the time and the distance of Charlemont from Armagh, as mentioned in this last part of Dr King's letter with Mr Stuart's,*  
it

*it probably must be the same woman's case which both of them relate.*

**XL.** *A Ring-scalpel for assisting the Delivery of Women in Child-birth ; by Dr THOMAS SIMSON, Professor of Medicine in the University of St Andrew's.*

**W**Hen I had the pleasure of being lately with you at Edinburgh, I spoke of an instrument invented by me, some time ago, for the safe extraction of children from the womb, when their bulk was greater than what could pass in an entire state ; now I send you a draught of that instrument that you may lay it before the society which publish the Medical Essays, to see if they have the same opinion of it that I have, that it is the most expeditious and safe yet proposed for managing cases of that nature.

It consists of two parts (see tab. iv. fig. 1) the broad ring A, and the short-scalpel B rivetted into it. The ring is made so large, that it can pass the first joint, and no further, of the fore-finger ; and the scalpel is about an inch in length, and a third in breadth, smooth and blunt along the upper side, sloping to a sharp point. Its use is, to divide the head or any other part of the body which cannot pass entire, of which instances occur every day to the practitioners in midwifery.

When the head comes first in the natural posture, it is not so necessary ; because the force of the labour in that case brings the head generally so far down, that safely, with an ordinary

nary scalpel or pen-knife, you can divide the pericranium and *dura mater*, and thus get the head opened, emptied and diminished, for its easy extraction: But when the head falls not down so far, as to allow you safely to guide an ordinary scalpel to divide it, some other instrument must be taken; it not being easy or safe to apply such instruments when the head is at any considerable distance from you, as frequently happens when you extract children by the feet, with heads not so well proportioned to the passage; for then the head, left by itself, is not kept so low down as when the parts about press upon it by the mediation of the rest of the body: Nay, for the most part, after the separation of the neck and body from the head, the *os uteri* contracts considerably upon the head, and with it returns to a considerable distance; so that I have been obliged, in managing them, to stretch my hand more than a foot up the vagina and uterus to reach them, nor could I keep the head nearer in the operation. In such cases, Hook's tiretets, and other instruments are applied with much uncertainty; and when the head is over large for the passage, to bring it away by force undivided, must cause great contusions upon the membranous parts lying betwixt the head and bones of the pelvis: To which I attribute the many bad consequences happening in these cases; and therefore I contrived the scalpel-ring I have sent you the draught of, which may be used safely within the uterus at any distance, which I do in the following manner. After being satisfied of the bigness

of

of the head, that it must be brought away with an instrument, I examine its situation with my hand, and where the futures lie: Then I put on the ring upon my fore-finger, with the scalpel with its edge facing the palm, so far up that it is quite over the last joint. In this situation, bending my finger at the middle joint to a right angle, the edge of the scalpel becomes parallel with the first phalanx, and is secured from doing any harm; while in this posture I slide my hand up, directing my other fingers extended towards the futures I fixed upon for the incision, which they easily find out again; and, having found them, the thumb and these fingers fix the head; while between them I stretch the fore-finger, hitherto bended, over the futures, and with it presses in the scalpel, cutting through the pericranium and dura mater, and slitting them so far as to let in my fingers. In doing this, because the ring is apt to be drawn off, I bend a little the last joint against the ring, and so keep it fixed in the operation. I caused the scalpel to be made as broad almost as the ring, to make the orifice greater as it enters.

Some authors seem not to allow of any case where an instrument is necessary: All that I shall say is, that they have been most fortunate in their patients; I having met with several, mostly indeed women of a bad make, and whose bones in their youth seem to have been diseased, in whom the head, however pressed or pulled, could not pass the bones of the pelvis; as very lately I found in a decrepit little woman about thirty, when in labour of her first child.

child. The arm presented first, and she had been three days in labour before I was called. I made some trials to get my hand up the uterus, to catch the feet, and turn the child, as I have done successfully in other cases: But I could not enter the *os uteri*, which gripped fast upon the shoulder of the child, though I tried it often; and therefore was obliged to bring down the arm, which had no signs of life, as far as possible, and separate it. After which, with a great deal of trouble, I got my hand up the pelvis, and brought down first one, and then a second leg, and with them wrought out the haunches and the sides bit and bit; and then brought down the second arm, and wrought out the shoulders. Now we had a good hold to fetch the head: But, however we drew and turned with the neck, and at the same time with the lower jaw, yet no artifice could bring it forth; and at length, in the operation, the neck yielded, and left the head behind, which immediately resiled from the straits of the pelvis, which it could never enter. To extract the head in this case, with hook or any other instrument, without a prior division, I was sure was impracticable; I therefore put on the ring, after having determined the place to be cut; made a slit at the fontanel in the manner I have described, took out one of the *ossa bregmatis*, and emptied the whole cranium: But though I could now grip fast the head, and pull strongly, yet it could not pass. And both the woman and I being tired, I left her three hours acquainting her she was in no hazard, and that, after such a delay the bones would

would separate with much less trouble; as I had experienced before in a woman of the same circumstances, who would not consent to my continuing to work any longer, after I had spent some time in separating some of the bones, but who called for me a few hours after, when they separated as easily as in boiled flesh. The same after three hours happened here. I took out the second *os bregmatis*, flattened the occiput and sinciput in a moment's time, and yet got the head, thus diminished, difficultly to pass; and no wonder; for, afterwards, in bringing away the placenta, my hand, grasping it, was hard pressed. She kept easy two days, with a moderate cleansing; but after that was seized with great pain over the whole belly, and died in a few days after, though bled and fomented with discutient herbs, and rubbed with camphorated oil. I attributed her misfortune to the bruising of the parts between the child and the bones of the pelvis, which certainly suffered when the haunches, shoulders, and the rest of the trunk of the body passed; and therefore I should think it always reasonable to diminish all the parts considerably in such cases.

I have been with women no less unfit for bearing, who, nevertheless, had no difficulty in a second child; but then they were younger than this woman, and, by the force in the first birth, the junctures of the bones of the pelvis had stretched, and thus had made the passage easier. In some of them I have found the *os coccygis* thrust so considerably outwards, as that with difficulty they sat upon it; but this

Fig. 1.

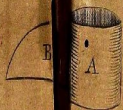


Fig. 2.

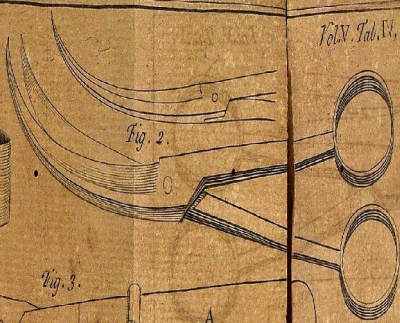


Fig. 3.

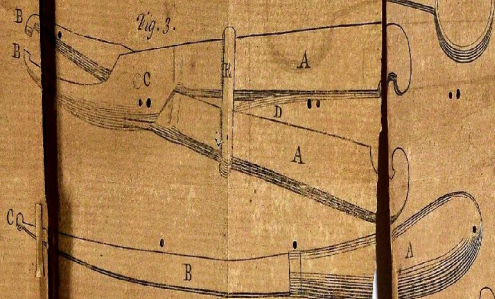


Fig. 4.



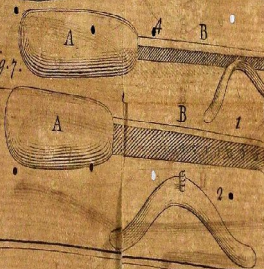
Fig. 6.



Fig. 5.



Fig. 7.



is they easily dispensed with for the advantage of an easy delivery: And as the cartilages are more yielding in the young than in the old, hence the odds must be deduced off the difference there is as to the easiness of their labour. I am not of opinion, that there is any thing of a total separation: But that the cartilages yield somewhat in younger subjects, both at the *ossa pubis*, and articulations of the ilia and sacrum, I think most credible, both from the design of nature in making articulations there, and likewise from what I once felt, as some others have done, at the symphisis between the *ossa pubis*, where the gap all along was sensible to the touch, as I made the midwife feel: And this could not happen without a small yielding of the *ossa ilia* from the sacrum; and a small yielding there must considerably widen the under-parts, or allow the *os coccygis* to go back. Such an yielding we allow in the cartilages of the back-bone, and from it account for our greater height in the morning than at night; and why not here? But I go too far from my first purpose, which was to recommend the ring-scalpel I have often used with success, when I am sure other instruments could not have been applied to much purpose.

XII. *A History of the Tibia taken out and regenerated; by Mr WILLIAM JOHNSTON, Surgeon in Dumfries.*

IN November 1726, Andrew Johnston, a boy 10 or 11 years of age, complained of violent

lent pain in both his legs. Two days after his first complaint I saw him; he then had no inflammation or swelling on them. I ordered him to drink the decoction of sarsaparilla, and to rub his legs with warm cloths, which he could not allow, it increased the pain so much.

Three days after I saw him again, when his pulse was quick, he had great thirst, and a large livid tumor appeared from the knee of each leg to near the ancles. I made an incision into one of them, and let out three ounces of a bloody sanies: Then searching with a probe, I found the tibia carious; therefore enlarged the incision, and felt the bone with my finger. I applied warm tincture of myrrh to the sore. Next day there was a large discharge of bloody sanies, with several livid spots, from which the same sort of sanies ous-  
ed. I cause the leg to be fomented with a decoction of aromatic herbs in wine, applied tincture of myrrh to the bone, and dressed the lips with warm digesting balsam. I opened the other leg, which had much the same appearance, and treated it in the same way, and ordered him to take some powder of peruvian bark in wine, and to drink the decoction of sarsa with lime-water twice a-day.

The ninth day after the first incision, several splinters of bones threw off, and in January 1727 the whole tibia of the one leg (which you will receive with this) came out: The leg was put into a box, and being carefully dressed was cicatrized before the middle of March.

The tibia of the other leg separated in small  
pieces,

pieces, and was slower in the cure, not being cicatrized till the beginning of May.

In June, the boy was able to walk without crutches. In August, he fell from a horse, and broke his thigh-bone, which cured soon; and the lad has continued well ever since, being fit for any country-work, with his legs straight, and only a little thickness at the ancles.

Before the bones cast out, the matter coming from the sores was so corrosive, that it blistered whatever part of my hands were wet with it in dressing him.

XLII. *A Description of several Chirurgical Instruments; by ALEXANDER MONRO, P. A.*

**B**EING persuaded that many surgeons are in possession of instruments, with which operations in surgery could be done with more safety and ease than with those commonly employed, and that these gentlemen only need to be acquainted how they could make them more generally known to be serviceable to mankind, I send you the inclosed figures and descriptions of several which I have now in my possession. If others think I have done justice to the gentlemen to whom I am obliged for most part of these, I flatter myself that they will allow me to serve them in the same way. If they send me useful or ingenious instruments, or the pictures of them, I shall add the descriptions and remarks, and shall lay them before your society, to publish, if you approve of them.

## T A B. IV.

*Fig. 2.* A pair of scissars, the blades of which are crooked in their flat sides. The lower figure is of the same size with the scissars: But Mr Cooper, not satisfied with this picture's distinguishing them well enough from the common scissars that are crooked in the narrow side of the blades, made the small upper figure, which shews better where the curve is. This scissars I had from Mr John Douglas surgeon in Edinburgh. They are very useful for taking off excrescences from hollow parts, or for cutting in curve lines, which the common scissars cannot easily be applied to.

*Fig. 3.* Is a needle-holder, which I had from the same gentleman. AA two flat shanks or handles, BB the two sides of its mouth grooved for keeping the needles steady, C the hinge, D a spring which keeps the handles asunder, and the mouth open, till the slip-ring or slider is thrust towards the end of the handles.

This instrument holds the needle more firmly, and its rings slides more easily than the common needle-holders which I have seen.

Mr Douglas observes, that needles of silver pierce more easily in stitching arteries after an amputation than the steel ones do.

*Fig. 4.* A bistoury and furrowed directory belonging also to Mr Douglas. A the handle, B the blade of the bistoury, C a button at its point, D the handle of the directory, whose groove is hollowed so as all its transverse sections

Fig. 2.



Fig. 3.



Fig. 4.

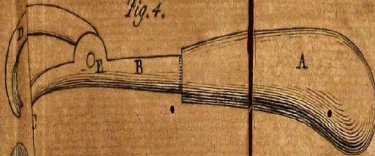


Fig. 5.

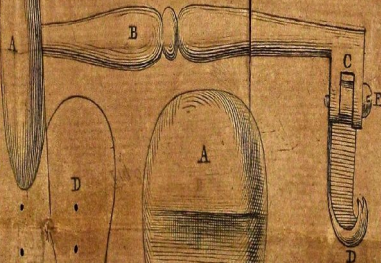


Fig. 8.

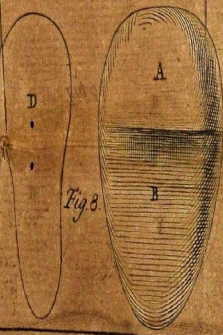


Fig.



Fig. 7.



R. Cooper fecit.

fections are like to what is represented at E; and therefore the button, once entered at the end of the groove nearest to the handle, cannot come out till it passes out at the other extremity.

In operating with this instrument, a misfortune is surely prevented which sometimes happens in opening sinuous ulcers with the common bistoury and directory, to wit, the bistoury starting out of the groove of the directory.

*Fig. 5.* The blades of a pair of strong forceps, the mouth A of which has on each side two small sharp teeth, which apply close one to another when it is shut. Mr. Douglas favoured me also with this.

In extracting bullets, the screw in a canula, which some recommend, cannot be forced into the bullet, unless there is the firm resistance of a bone on the other side; and the blades of the common forceps frequently cannot be introduced so far as the largest diameter of the bullet, without which they cannot take sufficient hold: Whereas the forceps here represented can be introduced into a wound safely when shut; and the blades being opened immediately behind the bullet, the teeth piercing into the lead, may have sufficient hold to bring it out, tho' they are not advanced so far as the largest part of it.

• *Fig. 6.* A trapan given me by Mr Douglas. AA two plates of brass kept together by four pillars of brass BB, C a handle moving a tooth-wheel which turns a pinion, to which G the  
 I i 3 socket

socket for receiving a common saw-head of a trepan is fixed.

The figure is one half the dimensions of the instrument. The saw will be turned more equally with this instrument than with the hand alone; but, whether the rattling or trembling which the wheels make are sufficient to counterbalance this advantage, I shall not determine.

*Fig. 7.* A levator of a depressed skull which I am informed Mr Petit surgeon at Paris shewed lately in the Academy of surgery there.

1. A the wooden handle, B the steel stalk with several holes, in which are female screws, C the lever bended down from the stalk.

2. The *rest*, with its feet covered with leather, and a male screw fixed in the top of its arch, but so as to be moved on a joint.

3. Another *rest* of the same make, but of a higher arch.

4. The instrument with its two pieces joined. This instrument is much preferable to the common ones employed for raising depressed pieces of the skull; the soft feet of the *rest* will scarce bruise the teguments, far less are they in danger of breaking the bone on which they are placed. The force with which the instrument acts can be increased or diminished according to the different hole of the stalk into which the screw of the *rest* is put. The farther from the handle, the longer is the vector, and the more power the hand moving it has. The screw allows the stalk to turn round,  
and

and the joint makes it capable of being raised or depressed.

T A B. V.

*Fig. 1.* Another levator, all of steel, given me by Mr Douglas.

AA the handle, B a male screw, C a wood screw, D a runner with a female screw, E a joint by which the stalk of the Claw, with teeth G, moves on the runner.

*Fig. 2.* The wood screw C, and the end of the claw G, to shew the claw of a different form, or forked.

When this instrument is used, the claw G is put under the depressed piece of bone, and then the wood screw being fixed into the exterior part of it, the surgeon draws the bone outwards or to any side at pleasure.

In some cases, where the direction of the force raising the bone must be varied, this instrument will be preferable to Petit's.

*Fig. 3.* A scoop for making the perforation into the nose in the *fistula lachrymalis*, belonging to Mr Douglas.

A the handle of wood or horn, B the mouth of the scoop, which is made very sharp.

To extract peas, cherry stones, or such substances, out of the noses or ears of children, Mr Douglas employed successfully the stiff adhesive paste put on the hollow end of a small piece of wood or ivory, with which jewelers draw diamonds out of the lockets in which they are set.

*Fig. 4.* An instrument for pulling teeth, given

ven to me by Mr James Douglas surgeon to the Welsh Fuzileers, only that I have added the wooden handle A, where there was a pounce in the one I had from him; B the stalk of steel, C the *rest*, D the claw, E the hinge on which the Claw moves.

When this instrument is used, the claw is put on the inside of the tooth to be drawn with its points as near to the roots of the tooth as they can conveniently be put. The end of the *rest* is placed on the outside of the gums, and a finger being placed above the claw to keep it from sliding, the patient's head is held by the surgeon, who presses down the handle to extract the tooth by raising the tooth, moved in an arch of a circle, from the socket.

Fig. 5. Another instrument for drawing teeth, given to me by Mr John Fothergill physician at London. A, a gimblet handle represented too small in the figure; this I added instead of a small cross-bar of iron. B the stalk, C the convex *rest*, D the claw, E the hinge of the claw.

While the claw is put as in the figure, the instrument can be applied to any tooth in the left side of the lower jaw, and to those of the right side of the upper jaw; but, by taking out the axis and turning the claw to the other side, it is fitted for applying to the *dentes molares* of the other side of each jaw.

The claw being placed and held down as mentioned of the preceeding instrument, the gimblet handle is twisted round, so that the convex *rest* is applied to the gum on the outside of the tooth, and then continuing the twist-

twisting, the action of the instrument is the same as of the former.

This instrument is altogether necessary for drawing the posterior grinders, especially in people whose mouth is little, and whose cheeks are thick, where the instrument *Fig. 4.* cannot be applied.

They have both greatly the advantage of the pelican, in so far as their action is not so oblique, and they are much less liable to slide.

*A propos* of these instruments for the teeth, I must observe, that the pounce has much better effect in pushing from within outwards than in the common way it is employed to thrust the roots of teeth from without inwards: This direction being often to thrust a vault on its convex side, while the former method is acting on its concave side; and therefore the stalk of pounces ought to be made longer than they are ordinarily made, that they may be put cross the mouth.

*Fig. 6.* The anterior view of a bolster for umbilical herniæ. AA, a plate of steel to which the convex stuffed bolster is sewed, BB a raised serpentine spring fixed to the plate AA at its extremity C; DD a cross-bar of steel to make the play of the spring equal, and to which the circular belt is sewed.

The patient keeping his or her belly distended, by retaining the breath, the circular belt is put so tight as to make the spring lie flat on the plate. When the belly is contracted the spring rises, and nearly an equal pressure is kept on the navel during inspiration and expiration, which cannot be done without the assistance

stance of a spring. One disadvantage however of this sort of spring, especially in big bellied people, is its rising too high : For such the spring may be made as in the following figure.

Fig. 7. A bolster for the navel. AA the plate of steel, B a flat serpentine spring, the end C of which is fixed into the plate, and to the other extremity one end of the circular belt is sewed to extend the spring as the belly stretches, the spring contracting as the belly subsides.

Fig. 8. A bolster for inguinal herniæ, considerably prominent at A, and thinner at B; the form of it appears better in the lateral view of it D.

The advantages of this form of a bolster I mentioned in an essay on herniæ sent you some time ago. (See p. 290.)

## T A B. VI.

Fig. 1. A sort of *bistoir cachee* in Mr John Douglas's possession.

A, a narrow bladed bistoury, B and C two sheaths made of thin plates of silver, between which is a groove in which the blade of the bistoury can be lodged.

The bistoury covered with either of them being introduced into a sinus, the silver sheath is withdrawn, and the surgeon cuts with the bistoury as he thinks fit.

Fig. 2. An instrument for opening *fistulae in ano*, which have an external orifice, but do not open into the rectum, though they run up

on the side of it. This instrument was contrived by Mr Adam Drummond, surgeon in this place.

A the handle, B the blade, of the shape of a joiner's furmer, C a nose of elastic flexible steel, with a button D at its crooked extremity. This nose I added. F a button, H the handle of the directory I, the groove of which is made as that of *Tab. IV. Fig. 4.*

The furrowed probe or directory being introduced into the sinus, with its groove towards the gut, the button F is entred into the groove at its extremity, and the furmer being pushed forward, its nose is directed into the anus, and the whole instrument is pushed upwards, as far as it can go, that is, till its button is stopt by the shut extremity of the groove of the directory, the edge cutting all the parts placed between the sinus and cavity of the gut, without any danger of hurting any part else.

One difficulty I found in using this instrument was its edge not cutting well, because it was only pushed against the parts, without running along to act as a saw does, which is the only way a cutting instrument has a right effect. To remedy this, I would propose to have the edge oblique from E to G, where the button should be put.

But there is still another inconveniency in the use of this instrument, to wit, the nose being stopped by the rugae of the rectum. A finger placed on the nose, when it is introduced into the gut, might however prevent this.

*Fig.*

*Fig. 3.* Another instrument for the same purpose, given to me by Dr Charles Ayton, Douglas of Finglassie in Fife.

A the handle, B the blade of a sharp pointed bistoury, C a thin plate lodged in a narrow sheath E of a directory, the handle of which is D; F a ring, G the cylindrical grooved directory.

When this instrument is employed, the blade of the bistoury is introduced into the sinus with such a sheath of silver as is represented *Fig. 1.* or by putting a probe point of wax upon it, the edge of the blade being placed towards the rectum, into which the furrowed directory is introduced as far as the ring F, which is a stop to it. Then the plate C is brought to slide into the sheath E, by which the point of the bistoury is guided, when pressed into the cut, to enter the groove of the directory; and, being kept there, the two instruments are drawn out, the blade of the bistoury cutting all that is between the sinus and cavity of the gut.

After describing two instruments for this operation of laying open sinuses which run upon the outside of the last gut, I must warn young surgeons not to be fond of undertaking this operation, especially if the sinus goes any considerable way up, and there is a thick bridge betwixt it and the gut. The reason of this caution is not so much on account of the hæmorrhage which sometimes happens after such an incision, nor thro' fear of the patient's not retaining the fœces after the cure; for surgeons generally get the hæmorrhage stopt, and the new flesh joins the divided parts

of the sphincter so well, that it does its office sufficiently: But I have several times seen a most obstinate diarrhoea come on some days after the operation, which hurried the patients to their graves.

On which account many years past, I have dissuaded all those who asked my advice for such a fistula, from allowing the operation to be done, and have cured all of them, whose constitution did not require the drain by the fistula, by causing the orifice of the fistulous pipe to be made straight with the pipe itself, encouraging the growth of flesh with injections of digestive diluted with oil, or with such like incarner, and keeping an emollient poultice on the part, without allowing tents, dossils, or probes to be put into the sore. Under this management several recent sinuses have filled all up, and got a firm cicatrix.—When hope of the parts uniting fails, I then desire drying injections, such as of lime-water, melrose, brandy, and at last of pure alcohol, to be made, that all the sinus may be fully dried and skinned over. Such dry pipes give no uneasiness or trouble, and gradually become much shorter.

*Fig. 4* Two views of a steel grooved catheter for performing lithotomy, in a manner a-kin to Celsus's, or upon the gripe, invented lately, as I am informed, by Mr. Le Cat surgeon and lithotomist at Rouen. Both figures are one third of the size which the instrument ought to be made of.

The superior figure represents the instrument when it is to be introduced into the bladder. A a female head or square socket,

BB two rings which serve as handles to it, C the round hollow part of the catheter, D a joint, E its point, where there is a second joint, F a square male head which can be fixed at any place of the socket by the screw-nail H, G is a ring which serves as a handle to the male head, to the further extremity of which a flexible wire is fixed.

The lower figure represents the same instrument, when the male square head is pushed quite down into the socket. A, BB, C, D, E, G, H, denote the same parts which were marked by them in the former figure. I is the flexible elastic wire pushed out by thrusting down the male head F, and raising with it the grooved part L, to which it is joined by a joint at K.

This instrument is introduced into the bladder, when it is as represented in the superior of the two figures, which, towards its point, is nearly of the form of a common silver catheter. Then the male head being pushed down, and consequently the moveable part of the other extremity being raised, as in the lower figure, they are secured in that form by the screw-pin H. The instrument is gently drawn outwards, till the part I, being resisted by the sphincter, as it is called, of the bladder, hinders it to be drawn further out of the urethra, when the instrument is raised up towards the *os pubis* of one side, by which the convex furrowed part L is made to press outwards, and may be felt between the *musculus accelerator urinae* and *erector penis*; so that the operator, after an incision thro' the teguments, cuts  
into

into its groove, and upon it enlarges his incision, and introduces his conductors and forceps to extract the stone.

Since your publishing the description and figure of this catheter, the Royal society at London has inserted Mr Le Cat's own account of this instrument, in their transactions, N<sup>o</sup> 476. § xi. which differs from the one I give, in his desiring all from the handle to near the first hinge D, to be made of silver, and all beyond that to be made of hard gold; but, as he complains of this bending in performing the operation, the steel one is preferable.——The inconveniencies, he says he found in operating with this catheter, and the death of the three patients who were cut when he used it, will probably make others unwilling to employ it.

*Fig. 5.* An aneurism needle, which is fitter for that operation, as proposed in your Vol. IV. Art. xvii. than the common one. • A its stalk fixed into a wooden handle, which is not represented here. B the curve, which is much larger than ordinary, C the eye very near the point, which ought to have been represented sharp, instead of appearing to be blunt.

The handle allows one to hold it firmer; the larger curve makes it apply better to the artery, which lies in a cavity; the eye near the point gives occasion for pushing less of the instrument behind the artery; and the sharpness of the point makes it pierce the thickned membranes, which require a very strong push of a blunt needle.

*Fig. 6.* A chisel with which the fingers or toes may be cut off, given me by Mr John Douglas, so often named above.

A the concave mouth, the edge of which is very sharp, B the head, C the handle stand transverse from the head.

When the common chisels, the stalks of which are long and perpendicular to the mouth, are used, the surgeon is always afraid of hurting his own hand when he strikes with a mallet, and therefore does not probably give such a smart stroke as he would otherwise. And if he does not strike perpendicular, he beats the chisel out of his own hand, misses the right amputation of the member, and bruises himself; all which inconveniences are prevented when a chisel of the form here represented is employed.

I could have sent you the figures of more chirurgical instruments; which are not painted in the common chirurgical books: But what are above are perhaps too many for one of your volumes; and, at least, they may suffice to let any gentlemen, who are possessed of instruments not generally described or painted, see what use I would make of them, if I could come to the knowledge of them.

*The end of the first Part.*

To the BINDER.

Tab. II.	{ fronting }	Pag. 182.
Tab. III.		
		184.