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With Alex. Ogston's

Compliments

ON
SOME FORMS OF SUDDEN DEATH,
AND
SUDDEN DEATH IN GENERAL.

By ALEX. OGSTON, M.D., Aberdeen.

TABLE I.—Of 580 cases of sudden death.

| Cause of death. | Number. | Percentage. | Remarks. |
|--|---------|-------------|--|
| Drowning | 98 | 16·89 | |
| Wounds and injuries | 87 | 14·99 | |
| Suffocation | 50 | 8·62 | 16 of these in new-born children. |
| Pneumonia | 49 | 8·44 | |
| Apoplexy | 43 | 7·41 | 3 of these in new-born children. |
| Still-birth | 33 | 5·68 | |
| Cause undiscoverable | 27 | 4·65 | 8 of these in adults, chiefly from decomposition, and 19 in new-born children. |
| Pulmonary apoplexy | 23 | 3·96 | |
| Poisoning | 23 | 3·96 | 1 of these in a new-born child. |
| Hanging | 17 | 2·93 | |
| Thrombosis | 14 | 2·41 | |
| Convulsions | 12 | 2·06 | |
| Aneurysm | 12 | 2·06 | |
| Exposure to cold | 12 | 2·06 | |
| Œdema of the lungs | 10 | 1·72 | |
| Encephalitis and brain disease | 9 | 1·55 | |
| Fatty heart | 9 | 1·55 | |
| Mechanical heart-disease | 7 | 1·20 | |
| Peritonitis | 5 | ·86 | |
| Rupture of the heart | 4 | ·68 | |
| Meningitis | 3 | ·51 | |
| Strangulation | 3 | ·51 | |
| Childbed diseases | 3 | ·51 | |
| Bronchitis | 3 | ·51 | |
| Hydrophobia | 2 | ·34 | |
| Burns | 2 | ·34 | |
| Hydrocephalus | 2 | ·34 | |
| Hæmoptysis | 2 | ·34 | |
| Starvation | 2 | ·34 | |
| Erysipelas | 2 | ·34 | |
| Scarlatina | 2 | ·34 | |
| Cellulitis | 1 | ·17 | |

TABLE I (continued).—Of 580 cases of sudden death

| Cause of death. | Number. | Percentage. | Remarks. |
|------------------------------------|---------|-------------|----------|
| Phthisis | 1 | ·17 | |
| Cholera | 1 | ·17 | |
| Liver disease | 1 | ·17 | |
| Pericarditis | 1 | ·17 | |
| Abortion | 1 | ·17 | |
| Ulceration of intestines | 1 | ·17 | |
| Hæmatemesis | 1 | ·17 | |
| Enteric fever | 1 | ·17 | |
| Old Age | 1 | ·17 | |
| | 580 | 99·89 | |

TABLE II.—Of 326 cases of sudden death occurring under ordinary circumstances.

| Cause of death. | Number. | Percentage. | Remarks. |
|--|---------|-------------|---|
| Suffocation | 50 | 15·337 | 16 of these in new-born children. |
| Pneumonia | 49 | 15·030 | |
| Apoplexy | 43 | 13·190 | 3 of these in new-born children. |
| Still-birth | 33 | 10·122 | |
| Cause undiscoverable | 27 | 8·282 | 8 of these in children and adults, chiefly from decomposition, and 19 in new-born children. |
| Pulmonary apoplexy | 23 | 7·055 | |
| Thrombosis of heart and main blood-vessels | 14 | 4·294 | |
| Exposure to cold | 12 | 3·681 | |
| Aneurysm | 12 | 3·681 | |
| Edema of the lungs | 10 | 3·067 | |
| Encephalitis and brain disease | 9 | 2·760 | |
| Fatty heart | 9 | 2·760 | |
| Mechanical heart disease | 7 | 2·147 | |
| Peritonitis | 5 | 1·533 | |
| Rupture of the heart | 4 | 1·227 | |
| Arachnitis and meningitis | 3 | ·920 | |
| Bronchitis | 3 | ·920 | |
| Hydrocephalus | 2 | ·613 | |
| Starvation | 2 | ·613 | |
| Hæmoptysis | 2 | ·613 | |
| Phthisis | 1 | ·307 | |
| Cholera | 1 | ·307 | |
| Liver disease | 1 | ·307 | |
| Pericarditis | 1 | ·307 | |
| Ulceration of intestines | 1 | ·307 | |
| Hæmatemesis | 1 | ·307 | |
| Old age | 1 | ·307 | |
| | 326 | 99·994 | |

TABLE III.—*Of cases of Sudden Death*

| No. | Age. | Sex. | Cause of Death. | Stage and Character of Pneumonia. | Seat and extent of Pneumonia. |
|-----|-----------|------|----------------------|-----------------------------------|-------------------------------|
| 1 | Adult | M. | Pneumonia | Not given | Not given |
| 2 | Do. | F. | Alcoholic poisoning | Red hepatisation | Double, partial |
| 3 | Boy | M. | Pneumonia | Gray hepatisation | Right, total |
| 4 | 6 weeks | M. | Do. | Red hepatisation | Double, partial |
| 5 | Adult | F. | Do. | Do. | Left, total ; right, partial |
| 6 | 25 | F. | Drowning | Do. | Double, total |
| 7 | Adult | M. | Pneumonia | Do. | Left, partial |
| 8 | Not given | F. | Do. | Do. | Do. |
| 9 | Adult | M. | Do. | Gray hepatisation | Right, total ; left, partial |
| 10 | 12 | M. | Thrombosis | Red hepatisation | Double, partial |
| 11 | 82 | M. | Pneumonia | Do. | Left, total |
| 12 | 70 | M. | Do. | Do. | Right, total |
| 13 | 38 | F. | Do. | Do. | Do. |
| 14 | Adult | F. | Do. | Do. | Double, partial |
| 15 | Do. | M. | Do. | Do. | Double, total |
| 16 | Do. | F. | Do. | Do. | Right, total ; left, partial |
| 17 | Do. | M. | Suffocation in smoke | Do. | Right, partial |
| 18 | Do. | M. | Pneumonia | Do. | Left, partial |
| 19 | Not given | M. | Do. | Tubercular hepatisation | Double, total |
| 20 | Adult | F. | Do. | Red hepatisation | Right, partial |
| 21 | Do. | F. | Apoplexy | Do. | Left, partial |
| 22 | 3 months | F. | Pneumonia | Do. | Left, total |
| 23 | Not given | F. | Do. | Do. | Right, partial |
| 24 | Do. | F. | Do. | Do. | Double, partial |
| 25 | Do. | M. | Meningitis | Do. | Right, partial |
| 26 | Adult | F. | Œdema of the lungs | Do. | Left, partial |
| 27 | Do. | F. | Hypertrophy of heart | Do. | Double, partial |
| 28 | Do. | M. | Pneumonia | Do. | Do. |
| 29 | Do. | F. | Exposure to cold | Do. | Right, total |
| 30 | Do. | F. | Pneumonia | Gray hepatisation | Do. |
| 31 | Do. | M. | Do. | Red and gray hepatisation | Right, total ; left, partial |
| 32 | Not given | M. | Do. | Red hepatisation | Right, total |
| 33 | Adult | M. | Do. | Do. | Left, partial |

¹ In this and the following Tables, old adhesions of the pleuræ

where *Pneumonia* is present.

| Pleuræ ¹ and Pericardium. | State of Heart and Valves. | Distribution and Character of Blood in the Heart. | REMARKS. |
|--------------------------------------|-----------------------------|---|--|
| Not given | Not given | Not given | |
| Healthy | Healthy | Clotted, equal on both sides | |
| Right pleurisy | Do. | Do. | |
| Healthy | Do. | Only on the right side | |
| Right pleurisy | Valvular disease | Not given | Mitral and tricuspid vegetations. |
| Healthy | Healthy | Only on the right side | |
| Right pleurisy | Do. | Equal on both sides | |
| Left pleurisy | Do. | Chiefly on the right side | |
| Double pleurisy | Do. | Do. | |
| Healthy | Do. | Thrombosis, chiefly on right side | |
| Left pleurisy | Do. | Fluid, equal on both sides | |
| Healthy | Do. | Only on right side | Thrombosis of right heart. |
| Right pleurisy | Do. | Not given | |
| Double pleurisy | Do. | Chiefly on the right side | Do. |
| Pericarditis | Hypertrophy of heart | Do. | Tricuspid valve fenestrated. |
| Healthy | Healthy | Do. | |
| Pleuræ and pericardium red | Do. | Do. | |
| Healthy | Do. | Do. | |
| Do. | Do. | Only on the right side | |
| Double pleurisy | Do. | Not given | Pericarditis also present. |
| Healthy | Do. | Do. | |
| Do. | Do. | Fluid, chiefly on right side | |
| Do. | Do. | Equal on both sides | Blood clotted in left, fluid in right heart. |
| Do. | Do. | Chiefly on the right side | Thrombus in pulmonary artery. |
| Do. | Do. | Do. | Thrombus in the right heart. |
| Fluid in left pleura | Fatty heart, and valv. dis. | Clotted, chiefly on right side | Tubercular mass in lower lobe of left lung. |
| Healthy | Heart large; valves healthy | Fluid, chiefly on right side | |
| Do. | Heart fatty | Fluid, equal on both sides | |
| Do. | Healthy | Thrombosis on both sides | Tubercles in apex of right lung. |
| Right pleurisy | Do. | Thrombosis on right side | |
| Healthy | Do. | Fluid, equal on both sides | |
| Right pleurisy | Do. | Fluid, chiefly on right side | |
| Healthy | Heart fatty | Empty of blood | Extensive pulmonary apoplexy of right lung. |

are disregarded, and such pleuræ are noted as healthy.

| No. | Age. | Sex. | Cause of Death. | Stage and Character of Pneumonia. | Seat and Extent of Pneumonia. |
|-----|-----------|------|------------------------|-----------------------------------|-------------------------------|
| 34 | Adult | M. | Pneumonia | Red hepatisation | Double, partial |
| 35 | Child | M. | Do. | Do. | Do. |
| 36 | Do. | M. | Do. | Do. | Do. |
| 37 | Adult | M. | Exposure to cold | Do. | Left, partial |
| 38 | Infant | M. | Pneumonia | Do. | Double, partial |
| 39 | Adult | F. | Do. | Do. | Right, total ; left, partial |
| 40 | Do. | M. | Do. | Do. | Left, partial |
| 41 | Do. | F. | Do. | Gray hepatisation | Right, total ; left, partial |
| 42 | Do. | F. | Do. | Red hepatisation | Left, partial |
| 43 | Do. | M. | Do. | Do. | Double, partial |
| 44 | Do. | F. | Do. | Gray hepatisation | Left, total ; right, partial |
| 45 | Not given | F. | Do. | Red hepatisation | Double, total |
| 46 | Adult | M. | Suffocation | Do. | Double, partial |
| 47 | Not given | M. | Softening of the brain | Do. | Left, partial |
| 48 | Adult | M. | Pneumonia | Do. | Double, total |
| 49 | Do. | F. | Do. | Do. | Left, total |
| 50 | Do. | F. | Do. | Do. | Left, total ; right, partial |
| 51 | Do. | F. | Do. | Do. | Double, partial |
| 52 | Do. | M. | Do. | Do. | Double, total |
| 53 | 65 | M. | Aneurism | Gray hepatisation | Right, total |
| 54 | Adult | M. | Apoplexy | Red hepatisation | Right, total |
| 55 | 10 weeks | F. | Pneumonia | Do. | Double, total |
| 56 | 62 | M. | Do. | Do. | Left, partial |
| 57 | Adult | F. | Do. | Do. | Double, total |
| 58 | 2 | M. | Do. | Do. | Left, total ; right, partial |
| 59 | Adult | F. | Do. | Do. | Do. |
| 60 | 40 | M. | Pulmonary apoplexy | Do. | Right, partial |
| 61 | 58 | M. | Apoplexy | Do. | Double, partial |
| 62 | 75 | M. | Pneumonia | Gray hepatisation | Right, partial |
| 63 | 58 | F. | Exposure to cold | Red hepatisation | Double, partial |
| 64 | 45 | F. | Pneumonia | Do. | Double, total |
| 65 | 47 | F. | Do. | Red and gray hepatisation | Double, partial |
| 66 | 65 | M. | Do. | Red hepatisation | Do. |
| 67 | 20 | F. | Œdema of the lungs | Do. | Left, partial |

| Pleurae ¹ and Pericardium. | State of Heart and Valves. | Distribution and Character of Blood in the Heart. | REMARKS. |
|---------------------------------------|----------------------------|---|--|
| Healthy | Healthy | Fluid, chiefly on right side | |
| Do. | Do. | Thrombosis of right side | |
| Do. | Do. | Fluid, chiefly on right side | Thrombus in right heart. |
| Do. | Do. | Equal and excessive on both sides | Thrombi on both sides of heart. |
| Do. | Do. | Chiefly on the right side | Thrombus in right heart. |
| Do. | Do. | Fluid, chiefly on right side | |
| Double pleurisy | Mit. and aort. disease | Do. | |
| Healthy | Healthy | Chiefly on the right side | Blood clotted in right, fluid in left heart. |
| Do. | Heart pale and flabby | Fluid, chiefly on right side | |
| Do. | Heart fatty | Do. | |
| Do. | Do. | Do. | |
| Double pleurisy | Healthy | Semi-fluid, chiefly on right side | |
| Healthy | Do. | Fluid, chiefly on right side | |
| Do. | Do. | Do. | |
| Do. | Do. | Do. | |
| Do. | Do. | Equal on both sides | Pulmonary apoplexy of lower two lobes right lung. Thrombosis of heart. |
| Do. | Do. | Semi-fluid, chiefly on right side | |
| Do. | Do. | Fluid, equal on both sides | |
| Do. | Do. | Fluid, entirely on right side | |
| Do. | Do. | Fluid, scanty on both sides | Rupture of iliac aneurism behind peritoneum. |
| Do. | Do. | Fluid, chiefly on right side | |
| Do. | Do. | Fluid, equal on both sides | |
| Do. | Aort. and mit. disease | Clotted, equal on both sides | Heart fatty. |
| Do. | Heart fatty | Semi-fluid, chiefly on right side | |
| Do. | Healthy | Clotted, chiefly on right side | |
| Do. | Heart fatty | Do. | Aortic and mitral disease. |
| Do. | Healthy | Fluid, equal on both sides | |
| Do. | Heart fatty | Only on the right side | Thrombosis of right heart. |
| Do. | Do. | Chiefly on the right side | Thrombosis of the heart. |
| Do. | Healthy | Abundant on both sides | |
| Do. | Heart fatty | Fluid, chiefly on right side | |
| Do. | Healthy | Clotted, chiefly on right side | |
| Do. | Heart fatty | Semi-fluid, equal on both sides | Do. |
| Do. | Do. | Fluid, equal on both sides | |

TABLE IV.—*Pulmonary Apoplexy.*

| Case | Sex. | Age. | Cause of Death. | Seat and Extent of Pulmonary Apoplexy. | Complications of Lungs, Pleure, and Pericardium. | Appearances in Heart and Blood-vessels. |
|------|------|-------|--------------------|--|--|--|
| 1 | M. | 56 | Apoplexy | Left, total | None | Blood chiefly on right side. |
| 2 | M. | 39 | Injuries of chest | Left, partial | Do. | Blood equal on both sides. |
| 3 | M. | Adult | Pulmonary apoplexy | Double, partial | Do. | Blood chiefly on right side. |
| 4 | M. | 10 | Stabbing | Right, partial | Pleurisy, hæmothorax | Thrombus in right heart. |
| 5 | F. | Adult | Fracture of skull | Left, partial | None | Blood fluid, chiefly on right side. |
| 6 | M. | Do. | Hæmoptysis | Double, partial | Pleurisy, double | Do. |
| 7 | F. | Do. | Pulmonary apoplexy | Left, partial | Adherent pericardium | Enlarged heart. |
| 8 | M. | Do. | Do. | Do. | None | Fatty heart, blood chiefly on right side. |
| 9 | M. | Do. | Do. | Right, total | Do. | Fatty heart, blood clotted, chiefly on right side. |
| 10 | M. | Adult | Peritonitis | Left, total | Do. | Heart empty of blood. |
| 11 | F. | 40 | Thrombosis | Left, partial | Œdema of lungs | Thrombosis of right heart and pulmonary artery. |
| 12 | M. | Adult | Pulmonary apoplexy | Double, total | None | Fatty heart. |
| 13 | M. | Do. | Do. | Right, total; left, partial | Do. | Fatty heart. Thrombosis of right side. |
| 14 | M. | 45 | Do. | Double, partial | Do. | Blood chiefly on right side. |
| 15 | F. | 16 | Do. | Do. | Œdema of lungs | Blood fluid, chiefly on right side. |
| 16 | M. | Adult | Pneumonia | Right, partial | Œdema and hep. of lungs | Heart fatty, with little blood. |
| 17 | F. | Do. | Pulmonary apoplexy | Right, total | None | Heart empty. |
| 18 | F. | Do. | Do. | Double, partial | Do. | Blood fluid, chiefly on right side. |
| 19 | M. | Do. | Fracture of skull | Do. | Do. | Blood fluid, equal on both sides. |
| 20 | M. | Do. | Pulmonary apoplexy | Do. | Œdema of lungs | Blood fluid, only on right side. |
| 21 | F. | Do. | Do. | Right, total; left, partial | None | Heart fatty. Blood fluid, chiefly on right side. |
| 22 | F. | Do. | Pneumonia | Right, partial | Red hepatisation | Thrombosis on both sides of the heart. |
| 23 | M. | Do. | Pulmonary apoplexy | Double, total | None | Blood fluid, only on right side. |
| 24 | M. | 24 | Do. | Left, total; right, partial | Do. | Heart fatty. Blood chiefly on right side. |
| 25 | M. | 75 | Do. | Right, total; left, partial | Do. | Blood fluid, chiefly on right side. |
| 26 | M. | Adult | Do. | Do. | Œdema of lungs | Blood clotted, only on right side. |
| 27 | M. | 40 | Do. | Double, partial | Red hepatisation | Blood fluid, equal on both sides. |
| 28 | M. | 50 | Do. | Left, total; right, partial | None | Blood fluid, chiefly on right side. |
| 29 | M. | 39 | Fracture of skull | Left, partial | Œdema and hep. of lungs | Thrombosis of right heart. |

| | | | | | | |
|----|----|-------|--------------------|-----------------------------|------|--|
| 30 | M. | | Pulmonary apoplexy | Double, partial | None | Blood fluid, scanty on both sides. |
| 31 | M. | 67 | Do. | Do. | Do. | Blood fluid, equal on both sides. |
| 32 | M. | 25 | Do. | Do. | Do. | Thrombosis of right heart. |
| 33 | M. | 56 | Fracture of skull | Double, total | Do. | Blood fluid, chiefly on right side. |
| 34 | M. | 37 | Pulmonary apoplexy | Left, total; right, partial | Do. | Heart empty of blood. |
| 35 | M. | 63 | Fatty heart | Left, partial | Do. | Heart fatty. Blood fluid, equal on both sides. |
| 36 | F. | 73 | Pulmonary apoplexy | Left, total | Do. | No blood in the heart. |
| | | Adult | | | | |

TABLE V.—*Thrombosis of the Heart and Main Blood-vessels.*

| Case | Age. | Sex. | Cause of Death. | Situation of Thrombus. | State of Heart. | State of Cardiac Valves. | Condition of Lungs. |
|------|-----------|------|---------------------------|------------------------------|-----------------|--------------------------------|---|
| 1 | 12 | M. | Thrombosis | Both sides and their vessels | Healthy | Normal | Congested and hepatised posteriorly. |
| 2 | 2½ | F. | Rupture of liver | Right cavities | Do. | Do. | Anæmic. |
| 3 | 73 | F. | Sores after injuries | Right ventricle | Do. | Do. | Normal. |
| 4 | 70 | M. | Pneumonia | Right cavities | Do. | Do. | Right lung hepatised and congested. Left lung congested. |
| 5 | 28 | M. | Thrombosis | Cavities on both sides | Do. | Do. | Normal. |
| 6 | Adult | F. | Pneumonia | Right cavities | Do. | Do. | Lower lobes hepatised. Remainder œdematous. |
| 7 | Do. | M. | Scarlatina after injuries | Do. | Do. | Do. | Normal. |
| 8 | 38 | M. | Hanging | Do. | Do. | Do. | Do. |
| 9 | Adult | F. | Injuries of larynx | Do. | Do. | Do. | Edematous. |
| 10 | Do. | F. | Thrombosis | Do. | Do. | Mitral and tricuspid thickened | Congested. Left lung œdematous. |
| 11 | 10 | M. | Stab in chest and liver | Do. | Do. | Normal | Pulmonary apoplexy of right lower lobe. |
| 12 | Not given | M. | Pericarditis | Do. | Do. | Do. | Tubercular. |
| 13 | Adult | M. | Erysipelas after injuries | Do. | Do. | Do. | Normal. |
| 14 | Do. | F. | Hæmorrhage from wounds | Left auricle | Do. | Do. | Do. |
| 15 | Not given | F. | Pneumonia | Pulmonary artery | Do. | Do. | Lower lobes hepatised. Remainder emphysematous. |
| 16 | Adult | F. | Arsenical poisoning | Right vessels and cavities | Do. | Do. | Congested and emphysematous. |

| № | Age. | Sex. | Cause of Death. | Situation of Thrombus. | State of Heart. | State of Cardiac Valves. | Condition of Lungs. |
|----|-----------|------|---------------------------|------------------------------|--------------------|--------------------------------|---|
| 17 | 17 | M. | Exposure to cold | Right cavities | Healthy | Normal | Anæmic. |
| 18 | 70 | F. | Do. | Do. | Right side thinned | Aortic and tricuspid thickened | Normal. |
| 19 | 83 | F. | Do. | Both sides and their vessels | Fatty | Mitral and tricuspid thickened | Anæmic. |
| 20 | Adult | F. | Rupture of uterus | Right cavities | Healthy | Normal | Normal. |
| 21 | Do. | M. | Suffocation when in drink | Cavities on both sides | Do. | Do. | Do. |
| 22 | Do. | F. | Fatty heart | Left cavities | Fatty | Do. | Do. |
| 23 | Do. | F. | Liver disease | Right vessels and cavities | Healthy | Do. | Do. |
| 24 | Child | M. | Starvation | Right ventricle | Do. | Do. | Do. |
| 25 | 14 | F. | Phosphorus poisoning | Right cavities | Do. | Do. | Do. |
| 26 | 3 | M. | Thrombosis | Right vessels and cavities | Do. | Do. | Congested and œdematous. |
| 27 | Adult | M. | Do. | Right cavities | Fatty | Do. | Congested. Left lung œdematous. |
| 28 | Not given | M. | Meningitis | Do. | Healthy | Do. | Lower and middle lobes of right lung hepatized. |
| 29 | Do. | F. | Hypertrophy of the brain | Do. | Do. | Do. | Congested. |
| 30 | 4½ months | M. | Starvation | Do. | Do. | Do. | Normal. |
| 31 | Adult | F. | Exposure to cold | Cavities on both sides | Do. | Do. | Left lung emphysematous. Right lung hepatized. |
| 32 | 40 | F. | Thrombosis | Right vessels and cavities | Do. | Do. | Right lung œdematous. Pulmonary apoplexy of left lower lobe. |
| 33 | Adult | F. | Pneumonia | Do. | Do. | Do. | Left lung congested. Right lung hepatized and œdematous. |
| 34 | 60 | M. | Thrombosis | Both sides and their vessels | Fatty | Aortic bony and insufficient | Much œdematous and congested. |
| 35 | Adult | M. | Do. | Right cavities | Do. | Normal | Do. |
| 36 | Do. | M. | Pulmonary apoplexy | Right vessels and cavities | Do. | Do. | Pulmonary apoplexy of right, and back of left lung. |
| 37 | Do. | F. | Aortic aneurism | Left ventricle | Healthy | Do. | Normal. |
| 38 | Not given | F. | Apoplexy | Right cavities | Do. | Do. | Do. |
| 39 | Child | M. | Pneumonia | Do. | Do. | Do. | Middle right, and upper left lobe hepatized. Remainder œdematous. |

| | Child | M. | Pneumonia | Right cavities | Healthy | Normal | Lower lobes hepatised. Remainder œdematous. |
|----|--------|----|-------------------------|-------------------------------|---------|-----------------------------|---|
| 40 | | | | | | | |
| 41 | Adult | M. | Exposure to cold | Both sides and their vessels | Do. | Do. | Lower left lobe hepatised. |
| 42 | Do. | M. | Encephalitis | Cavities on both sides | Do. | Do. | Emphysematous. |
| 43 | Infant | M. | Pneumonia | Right cavities | Do. | Do. | Hepatisation of both lungs, except upper lobes. |
| 44 | Adult | M. | Cut throat | Do. | Do. | Do. | Normal. |
| 45 | Do. | F. | Thrombosis | Do. | Do. | Do. | Tubercular and œdematous. |
| 46 | 35 | F. | Fracture of the skull | Do. | Do. | Do. | Congested and œdematous. |
| 47 | Adult | F. | Lung disease. Pneumonia | Cavities on both sides | Do. | Do. | Left lung hepatised. Pulmonary apoplexy of right upper lobes. |
| 48 | 4½ | F. | Poisoning with laurel | Do. | Do. | Do. | Normal. |
| 49 | 25 | F. | Arachnitis | Right cavities | Do. | Do. | Do. |
| 50 | 58 | M. | Apoplexy | Do. | Fatty | Do. | Back parts hepatised. |
| 51 | Adult | F. | Thrombosis | Do. | Healthy | Do. | Excessively œdematous. |
| 52 | 75 | M. | Pneumonia | Cavities on both sides | Fatty | Thickened | Gray hepatisation of right upper lobe. Remainder œdematous. |
| 53 | 39 | M. | Fracture of the skull | Right cavities | Healthy | Normal | œdematous, congested, and hepatised behind. 2. Apoplectic depôts. |
| 54 | 58 | F. | Exposure to cold | Do. | Do. | Do. | Hepatised behind. |
| 55 | 84 | M. | Thrombosis | Both auricles and the vessels | Fatty | Do. | œdematous. |
| 56 | 65 | M. | Pneumonia | Both sides and their vessels | Do. | Mitral and aortic thickened | Lower lobes hepatised. Upper lobes œdematous. |
| 57 | 55 | M. | Fracture of the skull | Pulmonary artery | Healthy | Normal | œdematous. |
| 58 | 70 | M. | Drowning | Right auricle | Do. | Do. | Do. |
| 59 | 49 | M. | Thrombosis | Both sides and their vessels | Fatty | Do. | Do. |
| 60 | 65 | M. | Exposure to cold | Left auricle | Healthy | Do. | Normal. |
| 61 | 56 | M. | Pulmonary apoplexy | Right cavities | Do. | Do. | Pulmonary apoplexy of lower lobes and right middle lobe. |
| 62 | 73 | F. | Thrombosis | Both sides and their vessels | Fatty | Do. | Congested. |
| 63 | 68 | M. | Do. | Do. | Healthy | Do. | œdematous. |

TABLE VI.—

| No. | Age. | Sex. | Cause of Death. | Situation of Edema. | Lung Complications. | Pleural Complications. |
|-----|-----------|------|----------------------|---------------------|---------------------------|---|
| 1 | 6 weeks | M. | Pneumonia | Double | Hepatisation | None |
| 2 | Adult | F. | Do. | Do. | Do. | Pleurisy. Containing fluid ¹ |
| 3 | Do. | M. | Do. | Right | Do. | Right pleurisy |
| 4 | Not given | F. | Do. | Double | Do. | Left pleurisy |
| 5 | Adult | M. | Do. | Left | Do. | Double pleurisy |
| 6 | 76 | M. | Fatty heart | Double | None | Serum in right pleura |
| 7 | 70 | M. | Pneumonia | Right | Hepatisation | None |
| 8 | Adult | F. | Do. | Double | Do. | Double pleurisy |
| 9 | Do. | M. | Do. | Do. | Do. | None |
| 10 | Do. | F. | Injuries | Do. | None | Do. |
| 11 | Do. | F. | Thrombosis | Left | Do. | Do. |
| 12 | Not given | F. | Brain disease | Double | Do. | Do. |
| 13 | Adult | F. | Pneumonia | Right | Hepatisation | Pleurisy. Containing fluid |
| 14 | 3 months | F. | Do. | Double | Do. | None |
| 15 | Adult | M. | Fractured ribs | Right | None | Hæmothorax |
| 16 | Do. | F. | Edema of lungs | Double | Do. | None |
| 17 | Do. | F. | Suffocation | Do. | Do. | Do. |
| 18 | Do. | M. | Fracture of skull | Do. | Do. | Do. |
| 19 | Do. | M. | Apoplexy | Left | Do. | Do. |
| 20 | Do. | M. | Edema of lungs | Double | Do. | Do. |
| 21 | Child | F. | Do. | Do. | Do. | Do. |
| 22 | Adult | M. | Do. | Do. | Do. | Do. |
| 23 | 3 | M. | Thrombosis | Do. | Do. | Do. |
| 24 | Adult | M. | Do. | Left | Do. | Do. |
| 25 | Do. | M. | Poisoning by morphia | Double | Do. | Do. |
| 26 | Do. | F. | Edema of lungs | Do. | Hepatisation | Fluid in pleuræ |
| 27 | Do. | F. | Pericarditis | Do. | Tubercular consolidation | None |
| 28 | Do. | M. | Pneumonia | Do. | Hepatisation | Do. |
| 29 | 40 | F. | Thrombosis | Right | Pulm. apoplexy | Do. |
| 30 | Adult | F. | Pneumonia | Do. | Hepatisation | Do. |
| 31 | Do. | M. | Hypertrophy of heart | Do. | None | Do. |
| 32 | 60 | M. | Thrombosis | Double | Do. | Do. |
| 33 | Adult | M. | Do. | Do. | Do. | Do. |
| 34 | Do. | M. | Pneumonia | Right | Hepatisation | Do. |
| 35 | Infant | F. | Bronchitis | Double | None | Do. |
| 36 | Not given | M. | Pneumonia | Do. | Hepatisation | Pleurisy, containing fluid |
| 37 | Adult | M. | Fatty heart | Do. | None | None |
| 38 | Do. | M. | Pneumonia | Left | Hepat. and pulm. apoplexy | Do. |
| 39 | Do. | M. | Do. | Double | Hepatisation | Do. |

¹ Serum in the pleuræ or pericardium

Œdema of the Lungs.

| State of Heart and Pericardium. | State of Blood in the Heart. | Distribution of Blood in Heart. | State of Cardiac Valves. |
|--|--|---|---|
| Healthy. Dilatation of heart | Not given Do. | Only on right side Not given | Healthy. Thickened mitral and tricuspid. |
| Healthy Do. Do. Heart large & fatty | Fluid Clotted and fluid Clotted None | Equal on both sides Chiefly on left side Chiefly on right side Both sides empty | Healthy. Do. Do. Do. |
| Serum in pericard. | Fluid and thrombosis | Only on right side | Bony points in mitral. |
| Healthy Serum in pericard. Healthy Do. | Thrombosis Clotted Thrombosis Fluid and thrombosis | Equal on both sides Chiefly on right side Only on right side Chiefly on right side | Healthy. Do. Do. Thickened mitral and tricuspid. |
| Do. Pericarditis | Fluid Not given | Do. Not given | Healthy. Do. |
| Serum in pericard. Healthy Do. Do. Do. Do. Do. | Fluid Clotted Fluid Do. Do. Do. Do. | Chiefly on right side Equal on both sides Chiefly on right side Do. Only on right side Chiefly on right side Only on right side | Do. Do. Do. Do. Do. Do. Insufficient aortic valves. |
| Do. Heart fatty Healthy Heart fatty Do. Do. | Do. Do. Thrombosis Fluid and thrombosis Clotted Do. | Do. Chiefly on right side Only on right side Equal on both sides Only on right side Chiefly on right side | Do. Do. Do. Do. Do. Thickened aortic and tricuspid. |
| Pericarditis | Fluid | Do. | Insufficient aortic valves. |
| Heart fatty Healthy Do. | Do. Fluid and thrombosis Do. | Equal on both sides Both sides full Chiefly on right side Equal on both sides | Healthy. Do. Do. |
| Adherent pericard. | Fluid | Equal on both sides | Thickened mitral and aortic. |
| Heart fatty Do. Healthy Do. Do. | Clot and thrombosis Fluid and thrombosis Fluid Clotted and fluid Fluid | Chiefly on right side Do. Equal on both sides Do. Chiefly on right side | Insufficient aortic. Healthy. Do. Do. Do. |
| Heart fatty Do. | Do. Do. | Equal on both sides Both sides empty | Do. Calcareous aortic |
| Healthy | Do. | Chiefly on right side | Healthy. |

is mentioned only when considerable.

| No. | Age. | Sex. | Cause of Death. | Situation of Edema. | Lung Complications. | Pleural Complications. |
|-----|----------|------|------------------------|---------------------|------------------------------|------------------------|
| 40 | Child | M. | Pneumonia | Double | Hepatisation | None |
| 41 | Do. | M. | Do. | Do. | Do. | Do. |
| 42 | Adult | M. | Edema of lungs | Do. | None | Do. |
| 43 | Do. | M. | Pulmonary apoplexy | Right | Pulm. apoplexy | Do. |
| 44 | Do. | F. | Pneumonia | Double | Hepatisation | Do. |
| 45 | Do. | F. | Do. | Do. | Do. | Do. |
| 46 | Do. | M. | Do. | Do. | Do. | Do. |
| 47 | Do. | F. | Do. | Do. | Do. | Do. |
| 48 | Do. | F. | Thrombosis | Left | Tubercle | Do. |
| 49 | 35 | F. | Fracture of skull | Right | None | Do. |
| 50 | Adult | F. | Peritonitis | Double | Do. | Do. |
| 51 | Do. | F. | Pneumonia | Right | Hepatisation | Do. |
| 52 | Do. | F. | Do. | Double | Do. | Do. |
| 53 | Do. | M. | Do. | Do. | Do. | Do. |
| 54 | Do. | M. | Pulmonary apoplexy | Left | Pulm. apoplexy | Do. |
| 55 | 65 | M. | Rup. of iliac aneurism | Right | Hepatisation | Do. |
| 56 | Adult | M. | Apoplexy | Do. | Do. | Do. |
| 57 | 10 weeks | F. | Pneumonia | Double | Do. | Do. |
| 58 | 5 weeks | M. | Smothering | Do. | None | Do. |
| 59 | 62 | M. | Pneumonia | Do. | Hepatisation | Do. |
| 60 | Adult | F. | Do. | Do. | Do. | Do. |
| 61 | 49 | F. | Edema of lungs | Do. | None | Do. |
| 62 | Adult | F. | Thrombosis | Do. | Do. | Fluid in pleuræ |
| 63 | 75 | M. | Pneumonia | Do. | Hepatisation | None |
| 64 | 39 | M. | Fracture of skull | Do. | Hepat. and pulm. apoplexy | Do. |
| 65 | 60 | F. | Fatty heart | Do. | None | Do. |
| 66 | 65 | F. | Old age | Right | Do. | Do. |
| 67 | 84 | M. | Thrombosis | Double | Do. | Do. |
| 68 | 47 | F. | Pneumonia | Left | Hepatisation | Do. |
| 69 | 65 | M. | Do. | Double | Do. | Do. |
| 70 | 64 | F. | Edema of lungs | Do. | None | Fluid in pleuræ |
| 71 | 55 | M. | Fracture of skull | Do. | Do. | None |
| 72 | 44 | M. | Edema of lungs | Do. | Do. | Fluid in pleuræ |
| 73 | 49 | M. | Thrombosis | Do. | Do. | None |
| 74 | 68 | M. | Do. | Do. | Do. | Do. |
| 75 | 20 | F. | Edema of lungs | Do. | Hepatisation | Do. |
| 76 | 42 | M. | Apoplexy | Do. | None | Do. |

| State of Heart and Pericardium. | State of Blood in the Heart. | Distribution of Blood in Heart. | State of Cardiac Valves. |
|---------------------------------|--------------------------------|---------------------------------|---------------------------------|
| Healthy | Fluid and thrombosis | Chiefly on right side | Healthy. |
| Do. | Do. | Do. | Do. |
| Heart fatty | Clotted and fluid | Do. | Do. |
| Healthy | Fluid | Only on right side | Do. |
| Do. | Clotted and fluid | Chiefly on right side | Do. |
| Do. | Fluid | Do. | Do. |
| Heart fatty | Do. | Do. | Do. |
| Do. | Do. | Equal on both sides | Do. |
| Healthy | Clot, fluid, and thromb. | Chiefly on right side | Do. |
| Do. | Thrombosis | Do. | Do. |
| Do. | Clotted and fluid | Do. | Do. |
| Do. | Do. | Do. | Do. |
| Do. | Fluid | Equal on both sides | Do. |
| Do. | Do. | Only on right side | Do. |
| Heart fatty | Clotted | Chiefly on right side | Thickened mitral. |
| Healthy | Fluid | Equal on both sides | Healthy. |
| Heart fatty | Fluid and clotted | Chiefly on right side | Thickened mitral and tricuspid. |
| Healthy | Fluid | Equal on both sides | Healthy. |
| Do. | Do. | Chiefly on right side | Do. |
| Heart fatty | Clotted | Equal on both sides | Thickened aortic and mitral. |
| Do. | Do. | Chiefly on right side | Do. |
| Healthy | Fluid | Equal on both sides | Thickened mitral. |
| Do. | Fluid and thrombosis | Chiefly on right side | Ossified aortic valve. |
| Heart fatty | Clotted and thrombosis | Do. | Thickening of all valves. |
| Healthy | Clotted, fluid, and thrombosis | Do. | Healthy. |
| Heart fatty | Fluid | Equal on both sides | Do. |
| Healthy | No blood | Both sides empty | Thickened mitral and aortic. |
| Heart fatty | Clotted and thrombosis | Equal on both sides | Healthy. |
| Healthy | Clotted | Chiefly on right side | Thickened mitral and tricuspid. |
| Heart fatty | Clot, fluid, and throm. | Equal on both sides | Thickened mitral and aortic. |
| Fluid in pericard. | Fluid | Do. | Do. |
| Healthy | Thrombosis | Only on right side | Thickened mitral and tricuspid. |
| Fluid in pericard. | Fluid | Equal on both sides | Thickened mitral. |
| Heart fatty | Thrombosis | Do. | Thickened mitral and tricuspid. |
| Healthy | Do. | Do. | Healthy. |
| Heart fatty | Fluid | Do. | Thickened mitral and aortic. |
| Do. | Do. | Chiefly on right side | Healthy. |

The causation of sudden death, although a subject to which a good deal of interest attaches, has hardly received from pathologists the attention it deserves; and consequently, while our knowledge of morbid anatomy is extending at a rapid rate, this particular province has still much unexplained and mysterious about it. That this should be so is the result of several circumstances. In the first place, the inquiry into the causes and modes of death is at no time an easy task; and, in the second place, the pathologist, to whom the medical world naturally turns for assistance, is not in a position to advance or to acquire much information bearing on this question. In our hospitals, institutions to which pathology owes its very existence as a science, the study of sudden and unexpected death is out of the question; such deaths occur in them only exceptionally, and the main aim of hospital autopsies is therefore almost exclusively the study of pathological lesions as connected with and suggested by the history of the individual obtained during life.

The position of the private practitioner contrasts favorably with that of the morbid anatomist in respect of opportunities for acquiring a practical knowledge bearing on this subject, and did the general practitioner avail himself of even a limited number of these opportunities, we would not have to complain of deficiency of information on this topic. But, unfortunately, in almost every instance, these are allowed to slip away, and to the lips of the physician called to the corpse of one who has suddenly and unexpectedly expired, the stereotyped verdict—heart disease or apoplexy—instinctively rises,—a verdict which has been, in some form or other, employed from time immemorial by the judicious practitioner, glad of a broad cloak for his ignorance, and an escape from the awkward questioning of the friends. In early times, it is well known, most sudden deaths were set down to the effects of poison, while in later years, the city of refuge for those who have not the courage to say, “I do not know,” has unfortunately been rendered nearly impregnable by the discovery of the fatty heart; so that it is not overstrained to say that, among the richer classes at least, it must seem to the uninitiated laity as if no one whose demise has been sudden and unlooked for could enter into his future state otherwise than in one of a very few ways.

All the blame, however, should hardly be thrown on the general practitioner, for indeed he would have his difficulties to contend with did he adopt any other course. To refuse a death certificate until an autopsy was allowed, in the face of the opposition of the relatives, and of the fear of some more unscrupulous rival, would be an act which few indeed would commend; and their scanty applause, even with the addition of an approving conscience, would be but small consolation for the empty pockets such conduct would entail.

It is hopeless, then, to expect enlightenment on this head from the general practitioner; and the sole other source of information consists in the judicial inquests on cases of sudden death, where the results of these are obtainable. It has therefore been the object, in putting together the above tables and the following remarks upon them, to compare the results furnished by such sources, with the notions, or, at least, the utterances of many who, holding the position of fathers and heads in the profession, are yet most active agents in perverting our registrar's returns to a monstrous extent. Indeed, when regard is had of the multitude of people who are returned, after sudden death, as having succumbed to heart disease and apoplexy, and of children who are rashly supposed to have been "overlain," not to mention other favourite but erroneous hypotheses, it must be confessed that very many columns of these returns are worse than worthless.

In relation to Table I, where the results of 580 cases of sudden death, as disclosed by post-mortem examination, are brought together, some few explanations are necessary. The table is compiled from a series of full records of complete post-mortem examinations in cases of sudden and suspicious death, made with the view of reporting thereon to the Crown authorities. Those cases embrace many deaths which, under usual circumstances, might not have come under the denomination of sudden and suspicious, but it has been deemed better to allow them for the present to retain their position, as they illustrate very well the general run of disease, and prove that many maladies, in themselves almost incapable of remaining unrecognised, under peculiar external circumstances, or possessing an unusually latent character, contribute their mite towards filling up the catalogue of sudden deaths. In glancing over the list, for instance, it cannot but excite surprise to see such maladies as enteric fever, scarlatina, erysipelas, starvation, &c., figuring among the causes of sudden death, and it would require an account of the peculiarities of each particular case, an undertaking which space forbids us entering upon, to vindicate for such diseases the position they are made to occupy. But the fact remains, that such diseases do, under exceptional circumstances, destroy life in such a manner as to deserve being classed among the others in the above table, hydrophobia being, perhaps, the only one which ought properly to have been omitted from it.

Besides these more striking diseases, there are a number of others which could not have been expected to occupy so prominent a place as they hold; diseases which, though generally running their course under the observation of the physician, do sometimes progress in so latent and insidious a manner that their existence remains unknown and unsuspected by the individual himself, and the autopsy gives the first hint of their having been present. Among these may be

mentioned pneumonia, cellulitis, meningitis, encephalitis, cholera, liver disease, hydrocephalus, peritonitis, pericarditis, and bronchitis.

To complete the table, deaths from wounds and injuries, drowning, poisoning, hanging, strangulation, burns, &c., have been retained, although, strictly speaking, they do not belong to cases of death occurring suddenly under ordinary circumstances.

In Table II, an attempt has been made to reduce the first table of cases more to the level of ordinary experience of sudden death, and to place together merely such instances as would, by most inquirers into the subject, be comprehended under this designation. At the same time it must be remembered that such a thing as an absolute definition of what constitutes an ordinary sudden death is, in the very nature of things, out of the question, and that, in proportion as the subject is regarded from the practical rather than from the theoretical side, the difficulties of drawing a line of demarcation multiply themselves. Hence cases of suffocation have been retained, since this accident, although rare and tolerably obvious to an eyewitness where occurring in adult life, forms a large proportion of the diseases of infancy where the termination of life is sudden and inexplicable. In truth, although the signs during the autopsy are perfectly diagnostic of this occurrence in many of the deaths of young children and even of adults, little or no idea can be formed from the circumstances or the accounts of the friends, as to the mode in which it had originated.

In the second table, those cases where the symptoms during life, or the marks and appearances on the body after death, or the history of the case, where obtainable, would, with approximate certainty, indicate the agency at work, have all been omitted. Cases of drowning, where the wet clothes, &c., would tell their tale; cases of wounds and injuries, cellulitis, poisoning, hanging and strangulation—where the mark of the cord would remain,—hydrophobia, burns, convulsions, childbed diseases, erysipelas, scarlatina, abortion, and enteric fever, have all been omitted; and if any still retained may seem liable to challenge, it may be urged that numbers of those omitted should by right have been retained, while it should further be borne in mind that the cases must be estimated as they occurred in practice, and not as our notions of probability would suggest to us.

In the second table, purged and curtailed as it is, we find, still playing a very important part, many diseases which could hardly have been supposed likely to be represented in it, and these are all the more striking, as they preponderate over, or at least rival in importance, other maladies recognised as causes of sudden death. In fact, the two generally recognised causes, heart-disease and apoplexy, sink into the shade when compared with the numbers of pneumonias, brain diseases, &c. Cases of apoplexy stand as 43, or

13 per cent., while pneumonia numbers 49, or 15 per cent. Three cases of apoplexy, too, occurred in new-born children, reducing apoplexy in more advanced years to 40, or 12·270 per cent.; none of the cases of pneumonia occurring in children so young as this. Fatty heart numbers only 9 cases, or 2 per cent., and mechanical morbus cordis only 7 cases, the two forms of heart disease making together 16 cases, or 4·907 per cent., and reaching, if rupture of the heart is included, 20 cases in all, or 6·134 per cent.

It will be observed that some of the headings embrace diseases as yet hardly recognised by the profession as existing in the form of independent maladies, and which are certainly seldom present to the mind of the physician when reflecting on the mechanism of death,—diseased states, for example, like pulmonary apoplexy, thrombosis, and œdema of the lungs, and which, nevertheless, indicate their frequent occurrence by the magnitude of the figures appended to them, being respectively 23, 14, and 10 in number; but as some of these will be referred to at greater length subsequently, a minute inquiry into their conditions of existence is needless here.

These results show how little in a given case the practitioner can guess what has been the agency at work, and although the cases on which they are based are derived, for the most part, from the poorer classes, the conclusions apply to a very great extent to all ranks of society. While among the wealthy, probably, some few of the latent diseases might have been discovered during life, those which remain are cases of maladies common to all grades and conditions of men, and which I have found in private post-mortem inspections in sudden death among the middle classes, to be very frequent indeed. In fact, the autopsies of private patients of my own and other medical men lead me to believe that in them the causes of sudden death are very much the same as among the lower classes.

Having observed how commonly pneumonia is present in the bodies of those who have died suddenly, and having been led to investigate as closely as possible all such cases which occurred, I was brought face to face with a series of pathological appearances within the chest, which I had frequently before observed, but of which, till then, I had failed to appreciate the importance, viz. the frequent occurrence, either separately or conjointly with each other and pneumonia, of such conditions as œdema of the lungs, thrombosis within the heart and pulmonary vessels, and pulmonary apoplexy, and the relations they bear to other diseases of the body.

On careful observation of even a few such cases, it becomes plain that some or all of these diseased conditions or their combinations, constitute, in certain diseased or debilitated states of the body, the regular mechanism of death, and the main difficulty lies in assigning to each its true position and importance in this respect. On purpose to facilitate, as far as possible, a searching study of the conditions

where each is present, it has been thought better to notice these diseases separately, and to draw up for each a brief table of the cases in which it was found.

Pneumonia.

To commence with pneumonia, which has, since the time of Laennec, been known as a frequent pathological occurrence, in the form of what he termed "peri-pneumonie des agonisans," pneumonia of the dying, and also in the form of true inflammatory pneumonia.

In regard to the different forms of pneumonia to be found in the dead body, and especially in regard to the causes and characters of such, great differences of opinion prevail. Most authorities agree in saying that to the naked or assisted eye of the pathologist the different forms of pneumonia present themselves with characters so identical, that from the appearance of the lung alone it cannot be determined what form of pneumonia was present, and even those who pretend to draw a distinction do it in such a loose and indefinite way, that their definitions may be thrown aside, and it may be assumed that the appearance of the lung is no guide to the nature of the process of inflammation going on in it. Every one familiar with autopsies will agree in this, that the different stages of congestion, red and grey hepatisation, being capable of being assumed by pneumonias of different forms, as from inflammation, from obstruction, or from hypostasis, the altered appearances of the lung tissue are identical in each. And yet the appearances indicate that a difference of cause must have been present, for in one case a single lobe of a lung is found, in what may be called inflammatory pneumonia, with its tissue solidified from exudation of lymph, and vascular and congested in addition, while the pleura or pericardium in its vicinity bears traces of recent and acute inflammation; in a second case a lobe is also found solidified from lymph (with perhaps less evidence of vascularity), and converted into a solid mass up to the very pleura covering it, and the pleura in this case will not so much as be reddened, although its cavity may contain a few drops of serum; while in a third case, a case of hypostatic pneumonia, the consolidation, not limiting itself to a lobe, but occupying more or less the back parts of both lungs, could with difficulty have its locality accurately defined, and shades off gradually and without distinct demarcation into the neighbouring healthy lung. It seems, in other words, as if the pneumonia of the second class were simply a concentrated form of the third class, or hypostatic pneumonia, and as if the inflammatory were merely this pneumonia of the second class, plus the peculiar inflammatory virus, which we do not know save by its effects on the pleura and pericardium, but which makes diseases elsewhere so different, which causes, for example, that the

serum in a case of acute peritonitis will give rise to a virulent poisoned wound when accidentally inoculated, while the fluid in ascites is utterly harmless.

The term "pneumonia from obstruction" has been applied to some forms of lung inflammation by a recent writer on pneumonia, Dr. Octavius Sturges, who in an admirable paper in 'St. George's Hospital Reports' for 1867, has discussed this subject fully and with great ability.

Dr. Sturges divides pneumonia into four classes.

1st. Pneumonia in debilitating diseases.

2nd. Pneumonia in specific fever, or where some secreting organ is interfered with, *i. e.* in blood poisoning.

3rd. Pneumonia owing to mechanical causes.

4th. Pneumonia from idiopathic lung inflammation.

In his paper on this subject, Dr. Sturges shows that we are, by mechanical means, in a position to imitate the state of hyperæmia and congestion preceding inflammation ('St. George's Hospital Reports,' 1867, p. 219). "Venous obstruction," he says, and he cites "Simon's Lectures" in support of his statements, "however produced will give rise to an exudation which will be serous, or albuminous, or spontaneously coagulable, according as the pressure is less or greater." Quoting also a paper by Dr. Robinson in the 26th volume of the 'Medico-Chirurgical Transactions,' Dr. Sturges shows satisfactorily that in the stage of fibrinous effusion which has been mechanically produced in the kidneys by obstructing the flow of blood through the renal vein, the difference between the appearances found and those present in inflammation "is more of degree than of kind," and applying the observations and arguments to the lungs, he proves (*l. c.* pp. 220—221) that a pneumonic infiltration from obstruction is a highly probable phenomenon.

But it seems to me that while quite justified in assuming that there is an obstructive, as distinguished from an inflammatory pneumonia, Dr. Sturges has not made out the same claim to separate the obstructive inflammations, under which head are included, not only those where obstructive heart disease is present, but also those where alterations of the blood, or loss of power of the heart exist, from hypostatic pneumonia; and further, that his fourth class of idiopathic pneumonia ought by rights to include his second class of inflammation occurring during specific fever and interrupted secretion, a class in which, he says, "the lung affection occurs with marked local symptoms, resembling idiopathic pneumonia, with which, indeed, it may be pathologically identical."

It would seem, on the contrary, more philosophical to class together all pneumonias where the true inflammatory element is present, and which would all be characterised by the sympathy of the system generally with the local disease, as expressed in the

accompanying fever, and usually by the local signs, and after death by the element of inflammatory infection of the neighbouring parts, pleura, pericardium, &c.; and this, while freely admitting that the same inflammatory pneumonia, occurring in extremely adynamic subjects, may completely alter its usual appearances and give rise to the typhous or adynamic form so well described by Trousseau ('Clin. Med.,' 1862, Tome I).

In regard to the other class of pneumonia, of which specific inflammation does not seem to form an element, it is only a forced distinction that can be drawn between the mechanical and hypostatic forms. There is nothing in the appearances or situation of the disease, or in its symptoms, which would justify their separation, unless perhaps that hypostatic pneumonia usually affects both lungs, and especially their lower and back parts; while mechanical pneumonia, on the contrary, is oftener seated in one or more lobes confined to these, and occupying their entire extent.

Dr. Sturges' views of the production of this form of pneumonia, while decidedly a great advance on what had previously been brought forward, have still something to be added to them; and it is this something which gives a similar meaning to the two last-mentioned classes of cases, and resolves pneumonia of this nature, not so much into a cause of death as into the position of a method or mode of death, as it appears really to be.

No doubt the weight of the experiments in regard to obstructed circulation producing fibrinous effusion, similar to that occurring in inflammation, is great, but it is not necessary that obstruction be called into account to explain the results. The chief effect of obstruction of circulation is to lessen the rapidity with which the blood flows through the vessels. Beyond effecting this, and a slight amount of increased pressure within the vessels, obstruction can have no effect, and it would seem more reconcileable with facts to attribute the phenomena produced to the diminished rapidity of circulation which ensues. This idea gains strength if it is borne in mind what is one of the chief phenomena of the inflammatory process as observable in the capillaries of a frog's foot. In it the lessened rapidity of circulation soon comes on, plays a very important part, and is quickly followed by exudation of liquor sanguinis, and other changes similar to those which supervene in the kidney, whose rapidity of circulation is lessened by obstruction applied to its vein. Diminished rate of circulation is known to produce œdema, and it seems no more than fair to attribute the appearances produced by venous obstruction to the diminished speed of the circulation which is its consequence. That this is true many facts indicate. Serous effusion is usually producible by venous obstruction, as seen in phlegmasia dolens, and is also producible by simply diminished rate of circulation, a fact so well known as to need no proof. It exists

also as the consequence of obstruction to the entrance of arterial blood, as in embolism of a part, where the diminished rate of circulation consequent on the plugging of the artery, produces the œdema characteristic of this occurrence. I have no doubt that in venous obstruction going on to the effusion of lymph, the retarded circulation is the most important factor, and that, although the pressure may also have its influence in producing the exudation, such exudation may occur without pressure and simply from retarded circulation, favoured in some cases by alterations in the composition of the blood. The doctrine of Virchow, that the fibrin of the exudation is the product of the tissues, not of the blood ('Cell. Pathologie,' pp. 154, 367; 'Spec. Path. und Therap.,' Bd. I, p. 75) may also be allowed some weight in the question of the production of these forms of pneumonia.

On these grounds we would attribute all non-inflammatory pneumonias to diminished circulation; and where the disease appears to have selected one particular lobe or locality, to the existence of something diminishing the circulation in that situation more than in the rest of the lungs.

Pneumonia of this sort occurs in individuals in whom an altered condition of the blood is usually distinctly present as the result of old disease of the kidneys, liver, or heart, or of habits of intoxication, bad nourishment, or of marasmus, old age, &c. In those individuals the lessening of the vital powers is coincident with a diminished rate of circulation and with altered properties of the blood, which reaching a certain stage produce the non-inflammatory pneumonia of the lungs, unattended with any symptoms, and, although the individual seems to die as the result of general debility, pneumonia reveals itself at the autopsy, vindicating its claim to be regarded rather as a mode than as a cause of death. Similarly does the disease originate in individuals the subjects of no enfeebling agency, but who, prostrated by fever, apoplexy, or some other severe malady, have the circulation gradually failing as their vital force becomes exhausted, until, in their last few days on this side of the grave, the circulation has diminished to such an extent as to produce pneumonic alterations in the lungs, alterations to be recognised, in all probability, for the first time on the post-mortem table. The occurrence of pneumonia in combination with other similarly produced modes of death, as œdema of the lungs and thrombosis, as will afterwards have to be explained, strengthens greatly this view of the subject, and I have little doubt that many of our diseases, occurring in connection with the tubercular diathesis, and yet showing no tubercular indications in the pathological appearances produced, as the central softening of the brain found in what is falsely termed acute hydrocephalus, are simply similar non-inflam-

matory tissue alterations occurring in states of retarded circulation, the locality of the disease being determined by some local cause.

The table which has been drawn up of cases of pneumonia embraces all those where pneumonia occurred in the 580 cases of sudden death, and contains, besides the 49 where pneumonia was returned as the cause of death, as being the most important post-mortem appearance, 18 others where it was present though subordinate. No attempt has been made to separate the forms of pneumonia further than concerns the stage in which they existed; and to avoid rendering the table too bulky for use, it has been thought necessary to omit mention of its connection with troubles of the kidneys and liver, and to confine the particulars noted to the more interesting combinations with pleurisy, pericarditis, fatty and other heart disease, fluidity and distribution of the blood, &c.

Pulmonary Apoplexy.

The cause of death, next in numerical importance to pneumonia, of which special mention has to be made, is pulmonary apoplexy.

Presenting itself, in its diffuse form, in frequent combination with pneumonia, thrombosis of the heart and œdema of the lungs, its importance is sufficiently demonstrated by the Table IV, where it is shown to have occurred, in the 580 cases, 23 times as the most marked appearance and therefore returned as the cause of death, and 13 times as a subordinate appearance; 36 times in all.

It is not proposed to discuss the subject of pulmonary apoplexy here; I would refer instead to a paper by my father on this subject, published in the 'Brit. and Foreign Med.-Chir. Review' for April, 1866, and to the table I have drawn up; but the question of how pulmonary apoplexy is produced is one on which a few words may with advantage be added.

The way in which pulmonary apoplexy presents itself in many cases is a frequent puzzle to the pathologist, and it—more perhaps than any morbid alteration—is to be found complicating cases where there already exists an evident and sufficient cause of death, or even it may be giving the appearance as if two causes of death were co-existing, and it is sometimes hard to determine which claims to be the most important cause. To take only one instance of this from the table, there are there noted four cases of fracture of the skull in which pulmonary apoplexy was present, and in each of these its extent varied; in one it existed merely as two apoplectic depôts in one lung; in another the whole of the lower lobe of the left lung was consolidated from this cause; in a third the back parts of both lungs were affected; while in the fourth the total extent of both lungs was the seat of the disease, there not existing a single portion of either lung, however small, which was not black, consolidated,

and nearly airless, from this infiltration of blood. This last case, occurring as it did in a man whose assailant was afterwards tried for culpable homicide, left the medical men engaged in the case in a very unenviable fix. The injuries in the head were confined to fractures of the basis cranii, to injuries of the brain, and to effusion of blood among the membranes of the brain, but not abundantly enough to have caused the slightest compression. The man was known to have been in perfect health the moment before receiving the injury. I saw him dead half an hour later, and yet here were two causes of death, each in itself sufficient, and none of which could have existed before the injury was received. The explanation which suggested itself to me was the following, and it may be applicable, to a certain extent, to more of the cases in the table than those where fracture of the skull caused death. In the case just cited the natural mechanism of death after the injury to the brain would be by coma, and hence collection of blood on the right side of the heart and in the lungs, causing congestion of these organs. Now, pulmonary apoplexy is merely an advanced state of congestion, where the blood is infiltrated into the substance of the lung tissue instead of being retained within the vessels. What was the cause which changed congestion into extravasation is not clear; it may have been excessive heart's action, or some local cause seated in the lungs; but even this imperfect explanation removes the difficulties of the case, by converting the pulmonary apoplexy from a primary to a secondary cause of death.

In the case in the table it occurred twenty-seven times in the male sex, and only nine times in females, or three fourths of the cases being among males, and only one fourth among females.

Thrombosis of the Heart and large Vessels,

Although constituting the cause of death in only fourteen cases, occurs in a much larger number than this, being present in all in 63 cases, or in 10·8 per cent. of the total number.

The phenomena of thrombosis, as studied and elucidated by Virchow and his followers, consist in the loss of fluidity of the blood or of some of its constituents within their proper channels or receptacles, and embrace the results (where any exist) of this coagulation. Thus, so long as the coagulation within the vessel gives rise to no obstruction to the circulation, symptoms of its existence may be entirely wanting, excepting in the case of a portion or the whole of the clot being washed away with the current of the blood and becoming fixed in the next portion of the vascular system whose diameter is too small to allow its passage. In these circumstances the phenomena of plugging of the vessel have been designated by the name of embolism, and the impacted embolus occasions frequently the formation on it of further depositions of coagulum.

The act of the washing away of a portion of the thrombus is commonly attended with rigors, and this symptom forms a good diagnostic mark in distinguishing embolism from absorption of septic fluid, which is seldom (if ever) attended with the production of rigors.

Where the original thrombus increases to such an extent as to offer a barrier to the circulation, or where the process presents itself as embolism, œdema of the part supplied by the vessels generally occurs.

In the heart and main vessels this process of thrombus formation constitutes an extremely common method of death, the thrombus being sometimes the main agent in the cessation of life, and sometimes only a subordinate appearance.

In chronic maladies attended with diminished rapidity of circulation, or with an altered composition of the blood, it is but natural to suppose, and the analogy existing in the process of spontaneous cure of aneurism confirms the supposition, that while the constituents of the blood, as already shown under pneumonia, occasionally deposit themselves in the tissues under the forms of serous and fibrinous exudation, such deposition should sometimes take place within the mass of the blood itself. And such deposition of fibrine in the mass of the blood I believe to be the only explanation which our knowledge admits of, of the production of thrombosis of the heart and large vessels in the process of slow and gradual death. The thrombi are usually found, when small, in some part of the organs of circulation where the blood current can be fairly supposed to be slowest, where there exists something like a side eddy in the stream of the circulation. Their deposition is more common and more copious on the venous than on the arterial side of the heart and vessels, and they seem to select, in preference to all other localities, the auricular appendices of the auricles for their first formation. In many cases the thrombus remains limited to the right, or to both auricular appendices, and is there observed as a soft pale-yellow gelatinous clot, composed of fibrine pervaded and soaked through with serum, and exhibiting, when cut into, a meshwork of pale-yellow, slender fibres, with a large quantity of yellowish straw-coloured fluid, mechanically held in their interspaces. The more central or oldest parts of the thrombus are paler and a little firmer than the more superficial or last formed parts, yet without anything like an attempt at arrangement into layers, such as is found in the brittle and more opaque lymph lining an aneurism. The thrombus is, in addition, usually firmly connected and interlaced with the unevennesses of the inner surface of the heart, so that a considerable amount of force is requisite to separate and isolate it. The next stage of the disease, where the circulatory disturbances favour the increase of the thrombus, seems to be the formation of other thrombi

along the course of the vessels connected with the heart, and in preference along the course of the superior vena cava and its branches, and it is possible to pull out from the interior of this vessel a long yellow clot, whose ramifications indicate that it has been formed in the superior cava, the innominate, jugular, and subclavian veins. The thrombus, however, seems seldom to fill the veins, and merely to exist as a continuous cord lying in their calibre, appearing, from its greater yellowness at one side, to have lain along one of the walls of the set of vessels. Within the head the sinuses are also occupied in part by such a line of yellow fibrinous thrombus. This thrombus appears to retain its position, and to avoid being washed down into the heart by the extent of its ramifications, the tenacity with which its several parts adhere together, and by the lessened force of the circulation to which it owes its deposition. *I do not recollect ever having met with an analogous formation in the inferior vena cava.* Along the curvature of the arch of the aorta, a similar small thread of thrombus is sometimes found, extending however neither into the arteries of the head and upper extremities nor into the descending aorta, to any distance. Exceptional forms of thrombi are occasionally met with, such as pale and little consistent clots, of the size of a bean, or thereby, which appear to have been floating free in the auricles, and which seem, from their complete and rolled aspect, not to have been anywhere attached. It may be doubted, however, whether their attachments have not been interfered with in opening the heart. Thrombi, such as above described, do not apparently become readily washed into the pulmonary artery, the clots found there being *usually* continuous with those in the heart, as a consequence of a continuance of the growth of the thrombus about to be described. In the more pronounced forms of the disease, the already existing thrombi, those particularly in the auricular appendices, and especially on the right side of the heart, suffer an increase of bulk from continued deposition of fibrine, and still firmly attached to the heart walls, they grow larger and larger until they, in many instances, occupy the whole of the heart's cavities, being firmly interlaced in the auriculo-ventricular valves, and extending into the pulmonary artery so far that, on drawing them out from this vessel, and floating the portion in water, they can be seen as a cast of the minutest ramifications of this artery. The extension of the thrombus into the pulmonary artery appears *for the most part* to take place by direct continuation of the cardiac thrombus into the vessel, and seldom by the development there of an independent thrombus, since in some cases the thrombus is found to pass from the ventricle only into the main stem of the artery, and ends suddenly in a blood clot; in other and more frequent cases the thrombus fills the main stem and a part of its two primary branches, while in a third series of cases, the casts of all, down to the finest ramifications, are yellow and

fibrinous. These thrombi in the heart and pulmonary artery do not distend the cavities in which they lie; even in the most advanced cases, they merely fill them. In a few of the autopsies the pulmonary veins were also filled with thrombi, which were continuous with that in the left auricle; but, as a rule, the development of thrombus on the arterial side of the lungs is very limited indeed, and confined almost entirely to the auricle and ventricle.

The extensive development of thrombosis is attended with a markedly œdematous condition of the lungs, a state usually present to a more or less marked extent in even slight cases, although sometimes it has been found wanting. In this œdematous state the lungs are bulky, pitting on pressure, rather heavy and solidified, and from their cut surfaces air and serum can with ease be expressed. In the more marked cases the serum is clear and yellowish, and the whole pours out in abundance, frothing like champagne; where less œdema is present, or where the lungs are congested, the serum is pinkish, tinged with blood.

Such a process as this naturally requires a little time, a few hours or so, for its production; and hence it is much more frequent in gradual deaths, however unexpected they may have been, or however sudden they may seem to the friends and neighbours, than in those where the very mode of death indicates that it must of necessity have been rapid. Out of 98 cases of drowning, it was met with but once, and in an individual drowned in this wise. He was a farm servant, and had been in bad health for some time. Walking near a pond one day he was taken ill, and falling into it was drowned before he could be rescued. In him the thrombosis may have been forming before he fell into the pond.

The table of cases of thrombosis shows that where it occurred the death was caused—

| | | | |
|-------------|---|---|---------------------|
| 14 times by | . | . | Thrombosis itself. |
| 9 | ” | . | Injuries. |
| 10 | ” | . | Pneumonia. |
| 1 | ” | . | Pericarditis. |
| 3 | ” | . | Poisoning. |
| 7 | ” | . | Exposure to cold. |
| 1 | ” | . | Childbed disease. |
| 1 | ” | . | Liver disease. |
| 2 | ” | . | Starvation. |
| 2 | ” | . | Brain diseases. |
| 2 | ” | . | Meningitis. |
| 1 | ” | . | Aneurism. |
| 2 | ” | . | Apoplexy. |
| 2 | ” | . | Pulmonary apoplexy. |
| 1 | ” | . | Erysipelas. |
| And 1 | ” | . | Scarlatina. |

In all which diseases the death would probably have been gradual, while it was found—once in death from suffocation, once in hanging, once in drowning (as mentioned above), and once in fatty heart; and in this case the thrombosis itself was more probably the true cause of death, whilst in the case of suffocation the individual was insensible from drink at the time, and was choked in his own vomit. Thus, out of 63 cases, it occurred only once in death which must of necessity have been sudden.

An altered and impoverished state of the blood appears to be an almost universal and very necessary condition in the formation of thrombosis. In young children, where the infrequent occurrence of chronic diseases leads to infrequent occurrence of impoverished states of the blood, thrombosis as above described is a rare phenomenon indeed. I have seen it once in a child three months of age, and in a case occurring since these tables were drawn up, once in a new-born child, where it existed as a rounded, complete, very soft, little consistent, and apparently unattached clot in the cavity of the right auricle. In all the other cases where it occurred the individual was above the age of three months.

The analogy of thrombosis as above described with that occurring elsewhere is seen from the existence of an œdematous state of the lungs, which was noted as present in 23 out of the 63 cases, while 27 times the lungs were tolerably healthy.

Finally, viewed in the light of being merely a method of death, thrombosis of the heart and large vessels is, as would be expected, frequently complicated with diseased states of the lungs other than œdema. In the table it will be found to have been coincident—

| | |
|--|-----------|
| With pneumonia in | 17 cases. |
| „ œdema of lungs in | 23 „ |
| „ pulmonary apoplexy in | 6 „ |
| „ tolerably healthy lungs in | 27 „ |
| „ fatty heart | 12 „ |

It would be interesting to know, in those who recover after such fibrinous thrombi have been deposited, what becomes of them, and whether they are always reabsorbed. It is possible, in some cases at least, that they might during recovery give rise to sudden death from being washed away and impacted in the pulmonary artery or elsewhere, producing in this manner the phenomena of embolism.

Œdema of the Lungs.

In Table VI (of œdema of the lungs) all cases where this is noted as having been present are included, with the exception of the cases of drowning in which it occurred, these having been omitted as irrelevant.

It will be perceived from this table that it usually exists along with some other important pathological appearance, but that some-

times it is itself the most important change observable after death, and it would be refusing credit to the evidence of our senses to deny that it occasionally exists in the dead body as the only morbid phenomenon, and is, therefore, in itself an idiopathic cause—or rather mode—of death. It is connected, like pneumonia and thrombosis, with debilitated states of the system, and in the remarks upon pneumonia its independent existence will be seen to be capable of being accounted for by diminished circulation existing in these debilitated individuals.

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