moved, with the result that the patients were troubled ever since with faecal fistula or pericæcal abscess, and on reflecting as to the cause of this untoward result and as to the means of preventing it, it seems to me that the cause of the trouble may be traced to the method employed in these cases of treating the stump of the appendix. When we make an opening into another part of the large or small intestine we always begin by sewing up the hole with fine silk or catgut sutures, bringing the mucous and muscular layers together, but we know that such a closure alone could not be trusted to retain the contents of the bowel, so that this first line of suture is invariably followed by a second row of sutures bringing peritoneal surfaces in contact and at the same time turning in the first row of sutures. No one would for a moment venture to close an opening in the bowel by picking up the edges of the opening and tying a ligature *en masse* around them, because this would simply bring mucous surfaces in contact, and when the ligature had cut through or otherwise fallen off the secreting glandular surfaces would separate and the contents of the bowel escape. The writer has never seen anyone, even the merest tiro in intestinal surgery, adopt this method of closing a hole in the intestine, and yet the appendix vermiformis is practically a part of the intestine, and what applies to the latter applies to the appendix in every respect. It has glands which secrete mucus imbedded in the mucous membrane, and therefore to the writer it seems quite as unsurgical to put a ligature around the base of the appendix from $\frac{1}{8}$ to $\frac{1}{4}$ inch from the cæcum and then to cut it off. Those who follow this method may say that they cauterise the mucous membrane after cutting off the appendix, and not only disinfect it but destroy its secreting surface. But this I maintain it is impossible for them to do, because they manifestly cannot reach the mucous membrane brought together by the ligature, nor still less the part of it which lies below the ligature. They may say that while my contention is theoretically correct, yet as a matter of fact the cases treated by a simple ligature and cauterising do perfectly well, which of course they believe to be the case in perfect good faith, not having always seen the patients a year or two later, as was the case in the two mentioned above.

The ideal method in the writer's opinion is for an assistant to hold up the intestine an inch on each side of the intestine while the operator catches the appendix and with a pair of scissors curved on the flat snips it off even with the bowel, first of course taking care to tie and separate the meso-appendix. The hole in the cæcum is then sewed up with fine silk, care being taken to include only the muscular layer and not the mucous membrane, as by doing so the silk might become infected. A director is then pressed upon the united edge until it sinks below the level of the surrounding intestine, when another row of sutures brings the peritoneal surfaces together. Such a hole will almost surely unite by primary union, doing away with all danger of faecal fistula or pericæcal inflammation by which the opening in the appendix is sometimes closed, and in which cases, although there is no faecal fistula, the patient is subject to a good deal of discomfort while Nature is throwing out a layer of plastic lymph to seal the defective closure. Some authors recommend the peeling off of the peritoneal coat of the appendix so to form a cuff $\frac{1}{4}$ inch long, and then after tying and cutting off the appendix in the manner which is condemned above make up for the defect by sewing the peritoneum over the end of the stump. This of course is much better than leaving a sloughing stump free in the abdomen, but is by no means so good as the method advocated above, in which no stump at all is left and nothing but a fine thin line of Lambert suture which we know gives absolutely no trouble. The author trusts that this suggestion will be generally adopted by those who are doing this life-saving operation so much more frequently than he. It is at least offered as his contribution to the improvement of the technique of the operation.

IRISH MEDICAL SCHOOLS' AND GRADUATES' ASSOCIATION.—The autumn dinner of this Association will take place at the Café Monico on Tuesday evening, November 2nd, at 7.15 P.M., when the chair will be taken by Professor Alexander Macalister, F.R.S. The Association on this occasion will entertain Field Marshal Lord Roberts, V.C., G.C.B.

THE SPECIFIC HEAT OF HUMAN BLOOD.

By W. F. LLOYD, M.B.CANTAB.,

Lampeter

THE researches which have recently been made to determine the specific gravity of human blood in health and disease have yielded results which are not only interesting, but may prove to be of great importance from a pathological point of view.

The application of physical methods to the investigation of physiological or pathological problems is always interesting, because the results must be accurate within the limits of experimental error. There is another physical property of the blood—namely, the specific heat—which does not seem to have been investigated in this country.

The following experiments were made with a view to determine the specific heat of human blood. The blood was received direct from the vein into a thin beaker, containing a certain weight of water at a known temperature. The temperature of the blood was assumed to be identical with that of the patient taken in the mouth. The highest temperature of the mixture was then accurately determined, and the amount of added blood ascertained by weighing. The following are the figures obtained from two experiments, and as may be seen the results agree fairly well with one another:

Weight of water	...	35.19 grammes	...	43.8 grammes
Weight of blood added	...	22.42 "	...	15.68 "
Temperature of water	...	15.9° C.	...	15.9° C.
Temperature of blood	...	36.1° C.	...	36.1° C.
Temperature of mixture	...	22.2° C.	...	20.0° C.
Rise of temperature	...	6.3° C.	...	4.1° C.
Fall of temperature	...	13.9° C.	...	16.1° C.
Specific heat	...	0.711	...	0.710

When the specific heat of the blood is known the amount of heat required to raise the temperature of a certain quantity of blood may be calculated. Let us suppose that the temperature of a patient whose weight is 65 kilogrammes is 37° C., and twelve hours after this the temperature has gone up 3° C. The weight of the patient's blood would be $\frac{1}{7}$ of 65, or 5 kilogrammes, and the amount of heat required to raise the temperature of 5 kilogrammes, or 5,000 grammes of blood 3° C. will be: $5,000 \times 0.71 \times 3 = 10,650$ heat units. This amount of heat must be derived from the chemical changes going on in the tissues of the body, and the amount of heat required to raise the temperature of the whole body would of course be much greater than this.

Now, this amount of heat may, by the use of Joule's equivalent, be expressed in terms of work; for every heat unit is equivalent to the amount of work required to lift 424 grammes 1 metre high against the force of gravity; therefore the mechanical equivalent of 10,650 heat units will be $10,650 \times 424 = 4,515,600$ grammes. This amount of work represents the chemical energy which must be required to raise the temperature of the blood of the patient 3° C. in twelve hours, and in every second the chemical changes going on are represented by the amount of energy required to lift 104.5 grammes 1 metre high against the force of gravity.

From this it will be seen that the amount of energy going on in the tissues of a patient whose temperature is rising must be very considerable, and about thirteen times greater than the above figures, for these figures apply only to the blood.

It is also possible that the difficult problem with regard to the number of atoms in the molecule of protoplasm, which has hitherto baffled physiologists, may be finally solved by an accurate determination of the specific heat of living protoplasm.

GLASGOW SOUTHERN MEDICAL SOCIETY.—The following are the office-bearers for the session 1897-8:—*President*: James W. Allan, M.B.; *Vice-President*: R. H. Parry, L.R.C.S.; *Treasurer*: G. W. Thomson, M.D.; *Secretary*: Wm. Watson, M.D., Gartmore, Langside; *Editorial Secretary*: Henry L. G. Leask, M.D.; *Seal Keeper*: Alex. Roxburgh, M.B.; *Court Medical*: J. Stuart Nairne, F.R.C.S., Alex. Rankin, M.D. Eben. Duncan, M.D., R. W. Forrest, M.D., Professor Jas. Dunlop, M.D. *Extra Members of Council*: J. Fraser Orr, M.D., Hugh Kelly, M.D., T. W. Jenkins, M.D. *Representative to Board of Victoria Infirmary*: Professor James Dunlop, M.D.