applies to an infected herd of cattle. It is "herd treatment." I quote once more words by Major Church:

"To the native races," as Sir Frederick Lugard has said, "civilization must mean something more than the methods of the development syndicate or the assiduous cultivation of new wants." . . . The pursuit of wealth, if it is accompanied by the careless exploitation of native races, is neither an honourable nor in the long run a profitable policy for the representatives of a great nation."

Disinfested labour is more profitable labour; and it is easier to treat a whole heavily infected community herd fashion, at the risk of a few deaths in uninfected persons, than to determine who are infected and to treat them only.

The second and antithetic usage is an expression of the belief that every individual is entitled to an individual diagnosis of infection before he is treated with a possibly lethal drug. It is based on conviction of the extreme value of mass treatment, even to complete disinfestation; but admits of no justification in morality, science, or expediency for the infliction of herd treatment on backward races. Those advocating this second usage can now ask, "What possible justification is there for the herd treatment of hookworm infection when mass diagnosis has become so exact, and can be carried out at the rate of a quarter of a million specimens a year for every four persons employed in the actual preparation and examination of specimens?" Surely the answer is "None." We are further advised to adopt for herd treatment the use of a drug which has "no lethal dose" yet kills unforeseen in a smaller dose than that which is in habitual use in herd treatment. At the same time we are warned that the drug should be avoided in certain conditions whose presence, in the very nature of things, herd treatment precludes our discovering. If in these circumstances we elect to use herd treatment we shall, I am satisfied, not merely have disregarded our individual professional obligation to those we treat, but will have set our feet deliberately on a path which, for us at the present time, will be devoid alike of reason and humanity.

USE OF SUBCUTANEOUS INJECTIONS OF OXYGEN.

BY

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EARLY in January of this year Dr. Murphy of Lisburn told me that, as a last resource, he had treated one of his dogs, suffering from double pneumonia following distemper, with a subcutaneous injection of oxygen, and that this was followed by a rapid and dramatic recovery. This method of treating pneumonia in dogs was introduced and has been advocated for some time by Colonel Ryan, F.R.C.V.S., Cork. He treats such cases from the very start in this way and does not wait till the animal is seriously ill. I related this case to one of my colleagues, Dr. Rowland Hill, showed him how to give the oxygen, and he has had at least one wonderful recovery, which he has published.

On February 4th of this year Dr. Boyd Campbell asked me to give oxygen to a man in his ward. It was the ninth day of an attack of double pneumonia in a man aged 45. When I saw him both lungs were completely involved and his blood pressure had fallen. He appeared to be moribund. He was given a large dose of oxygen at 12 noon, and he died at 4 p.m. At 8.45 p.m. on the same day Professor Symmers performed a *post-mortem* examination that was rather interesting. There was absolutely no rigor mortis, the blood that issued from the anterior skin incision was bright arterial blood, the muscles were a brilliant red, the parietal pleura was also bright red, and the blood in the inferior vena cava was a distinct blue colour, not at all black and tarry. The lungs were to a great extent in the state of grey hepatization and there was not a half-inch of healthy lung.

Since then several cases of acute lobar pneumonia have been treated with subcutaneous injections of oxygen immediately on admission to hospital, and their charts show uniformly good results. The crisis comes on very rapidly. A case of pneumonia complicating glossitis, a post-anaesthetic pneumonia, and a case in a man with a bad fracture of the pelvis have all done well.

These results, taken in conjunction with Dr. Cannon's recent work, as published in the *British Medical Journal* of April 21st, on the inhalation of warmed oxygen as an early method of treating acute pneumonia, are very interesting and suggestive. Dr. Cannon claims that pneumococci give off oxygen and when the gas is sufficiently concentrated in the tissues the micro-organisms die.

If oxygen—say about 150 c.cm.—is injected subcutaneously into a rabbit and a few minutes later blood is drawn from a vein of its ear, the blood will be found to be arterial in character, and when shaken up with air its colour cannot be heightened. Also such a large dose does not produce any bad symptoms, such as apnoea. There is no doubt that oxygen is rapidly absorbed.

In pneumonia there are two things wrong with the patient—a general toxæmia and the local changes in the lung. Usually the toxæmia is the cause of death; and the oxygen seems to do good by neutralizing the effects of the toxæmia as well as possibly by its action on the micro-organisms. Toxæmia kills by producing anoxæmia, with reduction of the alkalinity of the blood, and the clinical condition of acidosis is produced. The acids in the urine, and in bad cases the glycosuria, indicate this state. The kidneys and liver, the organs apparently responsible for maintaining the proper alkalinity of the blood, may both be upset. It is possible, therefore, that oxygen given subcutaneously acts, as Dr. Cannon thinks, by helping to kill the pneumococcus and at the same time counteracts the toxæmia.

Given subcutaneously oxygen certainly does not produce any lung trouble or aggravate any existing lung trouble, as it may when inhaled, even if heated; and although I have given it in at least two hundred cases, not a single local or general bad effect has been seen, so that it may be considered a perfectly safe procedure.

Subcutaneous injections of oxygen, besides being of great use in cases of pneumonia, are of value in all cases of anoxæmia, and these are numerous and serious.

Chloroform or post-anaesthetic sickness is due to acidosis, and all my operation cases in the Royal Victoria Hospital before leaving the table are given a dose of oxygen; with the result that sickness is much diminished; since January only one case out of two hundred has developed any post-anaesthetic pneumonia.

A striking effect of subcutaneous oxygen is seen in connexion with extensive burns and scalds of the body. I have long been interested in these cases at the Children's Hospital, and have tried to solve the problem of the rise of temperature about the third day and the subsequent fatal result. For years I believed this toxæmia was due to microbial infection, but after trying all the known means to combat such infection, and not meeting with any success, I gave up that theory. Lately I found that scalds and burns that are going to do badly develop, before any symptoms are noticed, a severe acidosis, and apparently the toxæmia is due, not to a bacterial infection, but to the breaking down of the damaged tissue—that is, it is due to histamine poisoning, or to something akin to it. Later on, undoubtedly, microbes may cause complications.

During the last two months all the cases of burns and scalds of the trunk admitted to my beds have been treated with oxygen, and only one patient has died; but this case was not admitted till the third day, when the temperature was raised, the pulse rapid, and acidosis well established. Three similar cases were admitted a few hours after the accident, were given oxygen at once, and all did well; at most their urine showed a slight and temporary acidosis. The amount of oxygen given was largely determined by the amount of acid in the urine.

An interesting point in connexion with anoxæmia is that symptoms do not appear till late, and once they appear the patient goes downhill very rapidly—almost as if he had fallen over a precipice. So that in treating anoxæmia,

or conditions giving rise to it, oxygen must be given early, before the patient becomes obviously very ill.

A girl in my ward for some weeks had small boils in various parts of her body, then she developed acute periostitis of the right radius—all due to a staphylococcal infection. When admitted her urine was very acid and contained sugar—it reduced Fehling's solution with the greatest ease. She was given 200 c.cm. of oxygen, and in twenty-four hours her urine contained only a trace of sugar. She had another 200 c.cm. of oxygen, and next day her urine was free from sugar. During that time no incisions had been made in her arm.

The apparatus needed for giving subcutaneous oxygen consists of the gas cylinder, a coarse piece of rubber tubing attached to the valve, and this coarse piece connected by a joint of glass tubing with a finer piece of rubber drainage tubing, to the end of which is attached the needle of a serum syringe. There is no need to heat or filter the

CHART 1.—Acute lobar pneumonia: the right lower lobe extensively involved, the left lower lobe to a less degree. The oxygen was given on the third day of the disease.

gas. A convenient place to give the injection is below and outside the nipple or breast.

At first I measured the amount injected by means of two graduated bottles, one of which contained water. Such an apparatus is a nuisance, and is not required. I found that if sufficient gas is admitted under the skin so as to inflate an area equal in size to the palms of two hands, the amount given is roughly equal to 200 c.cm. Much larger amounts can be safely given.

The time taken for the oxygen to be absorbed seems to vary according to the patient's need. It seems well in bad cases to give at least 400 c.cm. at first and then see the patient in six hours, repeating the dose if most has been absorbed. A large dose of oxygen can be given as easily and quickly as a dose of serum, and it is less painful.

CHART 2.—Acute lobar pneumonia: left lower lobe. The oxygen was given on the fifth day of the disease.

Since the early days of haematology, when Ehrlich's work became known, attention has been focused on the various white cells of the blood, and the red cells, though far more numerous, have not been talked about much in connexion with acute and chronic infections. Perhaps they have been unfairly neglected. By dosing our patients with oxygen in this safe and easy way we can give the red cells a chance to show what they can do.

I have felt impelled to write this note on account of the uniformly good results seen in pneumonia and in burns and scalds; on account of the simplicity of the method, and because I believe that the giving of oxygen is of benefit in many conditions. It is interesting to remember

that drugs such as alkalis, potassium chlorate, and potassium permanganate, all of which can help oxygenation, have long been popular in the treatment of acute and chronic toxæmias.

The accompanying temperature charts are typical of cases of acute pneumonia treated with subcutaneous oxygen.

POST-MORTEM FINDINGS IN A CASE OF RENAL DWARFISM.

BY

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THE case here recorded appears to be of interest because of the absence of bone deformity in a girl presenting the other features of renal dwarfism.

Clinical Notes, May 1st, 1928.

The patient was a girl aged 16 years. The history obtained stated that six months previously she had an attack of pain in

FIG. 1.—Kidney, weight 21 grams (normal weight 140 grams).

the abdomen with vomiting and diarrhoea. She went to an institution and returned benefited. She remained well until three or four weeks ago, when she suffered from abdominal pain and vomiting, and mentally was rather dull.

When admitted to the Royal Infirmary, Sunderland, on May 1st, the child looked drowsy and complained of abdominal pain. She was seen to be markedly undeveloped, looking between 11 and 12 years of age. The abdomen was rather

FIG. 2.—Kidney, laid open. Weight 21 grams.

tumid. The heart showed no abnormality. The urine had a specific gravity of 1010, neutral reaction, albumin present, no blood, pus, or sugar. An endocrine defect was suspected. An x-ray report of the region of the pituitary fossa showed no enlargement of the sella turcica. The Wassermann reaction was negative. The blood count showed: haemoglobin 45 per cent., colour index 1.02, red blood cells 2,200,000 per c.mm., white blood cells 9,600 per c.mm. Differential white cell count: polymorphonuclears 81 per cent., lymphocytes 18 per cent., no eosinophils or basophils, large mononuclears 1 per cent.

The patient gradually became comatose and died on June 3rd, apparently of uræmia.