

the pulmonary capillaries, and that the implication of the alveoli is a secondary matter; that catarrhal pneumonia is primarily a catarrh of the alveolar epithelium; and that hence the former is an *extra-alveolar*, and the latter an *intra-alveolar*, disease. It appears very much as if the sudden distention of the pulmonary circulation in croupous pneumonia is due to a general loss of vasomotor nerve-tone in the affected part, and that hence the real source of the disorder is to be looked for rather in the nerve-supply than in the lung itself.

Another question of intense interest from a therapeutic standpoint is whether croupous pneumonia is a self-limited disease in the same sense as is understood in smallpox, measles and other well-defined and self-limited diseases. If it is self-limited, then all you can expect to do is to stand by and watch the symptoms, without any thought of restraining or controlling the disease. Smallpox goes through a series of well-defined steps, none of which are retraced during the same attack, while pneumonia invades a certain tract of lung tissue, and in a day or two, or longer, extends its territory. Given a deposit of exuded material in the air-cells, the time necessary for the lung to free itself of this product is governed greatly by the number of times the exudation imposes itself on new ground. This is not true of any infectious or self-limited disease. There certainly are relapses, as in typhoid fever, for example, but it cannot be said, with any degree of truth, that in such instances the disease extends into fresh tissues, but rather that it repeats its assaults on tissues which had been previously invaded. To me it seems very probable that the progress and intensity of acute pneumonia are controlled by the degree of lung-resistance which is offered by the constitution to the spread of the disease, and that it is not self-limited in the true meaning of that term.

The therapeutic indications in this disease are:

- (1) A circumvention of the inflammatory process;
- (2) a reduction of the temperature; (3) a toning up of the pulmonary and cardiac innervation; and
- (4) a support of the constitution.

*Circumventing the inflammatory process.*—It makes very little difference from a therapeutic standpoint whether we regard the pulmonary stasis as the result of increased blood-pressure or of a semi-paralyzed condition of the blood vessels. For practical purposes, it is enough to know that the lungs are over-charged with blood, which will, sooner or later, flood the whole implicated area with some of its constituents, and that we must aim to relieve this condition. Now, what measure or measures will accomplish this end? It may be said that the "old and well-tried" method of venesection is a remedy which is highly recommended for this purpose. Whether it succeeds is indeed questionable. Venesection is a keen-edged sword, and, while its employment may cut short some

cases of pneumonia, it has also aggravated some, and accomplished no good in many others. From what has been said, it is evident that, if it is ever to be employed, it is only applicable in croupous and positively forbidden in catarrhal pneumonia. Local bleeding, such as cupping or leeching, is frequently employed with advantage over the inflamed lung.

Croupous pneumonia, being a disease, however, which tends to undermine the vitality of the patient more quickly than any other acute disease, with the possible exception of cholera and yellow fever, it seems, indeed, a serious matter to advocate a treatment, which, if it fails to check the disease in its incipency, certainly enhances the pathological trend of the disease and aids in defeating the very end for which it is employed. For the purpose of counteracting the spread of the pneumonic process, I have, therefore, lately applied rubber bags filled with ice over and around the inflamed lung area, and, so far as I can see, with rather favorable results. At least, I think this is a measure which bears repetition.

Aconite and veratrum viride are also useful in reducing the pulmonary hyperæmia. Of the two I prefer aconite, because its physiological effects can be produced with greater certainty and safety. It must be given with effect and it is well to begin with drop doses of the fluid extract every half hour, or two drops every hour, until the pulse becomes soft and easily compressible.

*Reduction of fever.*—All the depressant measures which have been mentioned—viz.: local bleeding, local application of ice, aconite and veratrum viride—have a strong antipyretic action; but over and above the influence of these agents, steps must be taken to depress the pyrexia in a more direct manner. This is accomplished by applying ice to the head and neck, by sponging the body with cool water, adding to the latter alcohol, bay rum, vinegar, or liquor ammonia. Quinine may be administered in ten or twenty-grain doses three or four times a day. Binz has shown that this alkaloid exerts an inhibitory influence on the migration of leucocytes—a process which is actively going on in pneumonia—and it may therefore serve the double purpose of diminishing high temperature, and of restraining undue cellular activity. It is possible, however, and indeed it is probable that quinine manifests its febrifuge power by checking cellular metamorphosis. Phenacetin, antifebrin and antiyprin, the first two in four grains, and the latter in from seven and a half to fifteen-grain doses, every four hours, are productive of excellent results, and one of these agents should always be employed.

*Elevating the nerve tone.*—Whatever the precise relation may be which exists between croupous pneumonia and the nerve-supply of the lung, it is very certain that the former process is always ac-