

a cloudiness is produced, showing that this contains substances insoluble in glycerine. It is this fluid, the "T. R.," which Koch believes is the remedy for tuberculosis.

The remedy is given in the same way as tuberculin, beginning with a very minute dose, and increasing gradually until the maximum is reached. The fluid contains eight milligrammes of the active principle in one cubic centimetre, and is diluted with salt solution in order to obtain a small enough dose. The initial dose is one-five-hundredth milligramme, but if a reaction follows the dose it must still be further reduced. The injections are made every second day, and the dose is gradually increased during a period of two or three weeks to twenty milligrammes. If any elevation of temperature occurs, it must be allowed to subside before another injection is given.

The preparation of T. R. requires the exercise of many precautions. In the first place, not every culture of tubercle bacilli is fit for the preparation of an efficacious T. R. Koch's experiments, which he will describe at some future time, have shown him that all tubercle bacilli are not so uniformly virulent as is generally supposed. Cultures which have been growing through many generations in the laboratory will, as a rule, be found to have lost their virulence in great measure, but for the preparation of T. R. only virulent cultures are to be employed. The drying of the culture must be done in a vacuum exsiccator, and all chemical contamination in the process of manufacture must be avoided, for T. R. is very unstable. The cultures and the completed preparation must also be kept away from the light. Complete separation of T. O. and T. R. is obtained only when the completely clear T. O. has taken up at least fifty per cent. of the solid substances, and it is very necessary that the two should be completely separated, for if T. R. contains any T. O. an undesirable reaction will follow the injection. Naturally the preparation of this new tuberculin, with its trituration of perfectly dry cultures of exceedingly virulent tubercle bacilli, is in the highest degree dangerous to the operator, and Koch says that he felt always as though he were dealing with high explosives. The preparation of large quantities should, he thinks, be undertaken only in establishments where the danger could be reduced to a minimum by the use of suitable mechanical appliances. The fluids can be preserved by the addition of about twenty per cent. of glycerine, which is not enough to cause a precipitation of the T. R.

As to the results of T. R. injections in guinea-pigs and in man, Koch speaks with confidence. He has tried it in lupus and in pulmonary tuberculosis, and the results have been such as to cause