Miss Nightingale's ideals for nurses in an educative way, and would be useful and permanent. It is intended to endow a Department of Nursing and Health in some English College, and thus "found a living memorial, which will offer to women of the future opportunities to fit themselves to carry on Miss Nightingale's work." At San Francisco it is planned to have nurses of every country, race and creed join in bringing gifts, large or small, and offering them for this high object, which will form some little payment of the debt all nurses owe to the Lady in Chief.

No arrangements have yet been made in India for collecting this fund and it is not known who will be the delegates from India at the meeting of the Council, but it is time to begin to think about collecting money and a Committee should be appointed for that purpose.

Our readers will learn from the special review of the Life of Florence Nightingale in this number how great were Miss Nightingale's efforts for this land, and how keen her interest in its welfare, and this knowledge should stir up a fresh desire to bring a worthy gift to honour her memory.

INFECTION.

ITS CAUSES, ITS MODES OF TRANSMISSION AND ITS PREVENTION.

By Dr. N. H. Clubwalla, L. M. & S., B. Hy.

Asst. Bacteriologist and Senior Asst. to the Physician,
"Dr. Masina's Hospital," Bombay.

INFECTION may be defined as the invasion of the body by living agents which grow and multiply in various parts of the body and produce symptoms by forming toxic substances.

I. The Causes of Infection :—

The causes of infection may be put under two classes, the predisposing and the exciting; the first class comprising those conditions which so modify the health of the patient as to render him apt or predispose him to contract the infection, to the specific influence of which he happens to be exposed; the second, those causes which immediately impart or excite disease and give it its specific character. As for example a man who has been suffering from privation, or has been in a debilitating condition from want of food especially of the fatty elements, is exposed to Tubercular infection and contracts Tuberculosis. In this case clearly enough, privation or any debilitating cause is the predisposing cause and the micro-organism discovered by Koch, Bacillus Tuberculosis is the exciting cause. On the whole, we mean by exciting cause the specific cause, *i. e.*,

that definite micro-organism which gains entrance into the animal or human body and gives rise to that definite or specific disease, whereas by predisposing causes, we mean those general non-specific conditions which by their influence so modify the health of the system or of parts of it as to render them a specially suitable soil for the growth of micro-organisms when they happen to become implanted in them.

Predisposing causes are :—

(1) *Age* :—The influence of age is considerable, the periods of growth and decline are naturally more liable to disease than that of adult maturity. The diseases that affect the growing period also naturally are different from those that affect declining age. For instance, children are more liable to acute catarrhal inflammations of mucous membrane especially of that of the alimentary canal ; to spasmodic affections especially convulsions ; to skin diseases and to acute Tuberculosis. In addition children suffer especially from Measles, Whooping Cough, Small-pox, Scarlatina, etc., because probably most persons after this period have been rendered insusceptible more or less by a previous attack and children are most readily affected by diseases dependent on insanitary conditions, such as overcrowding, bad water, privation, etc., probably because their power of resistance is relatively small.

(2) *Sex* :—It has very little influence on infection except certain infections connected with the occupation, and are peculiar to either sex.

(3) *Heredity* :—The influence of heredity is very marked in the difference of stamina or robustness or capability of resisting unfavourable influences possessed by different families.

(4) *Hygienic Conditions* :—A marked predisposition to many infections is acquired by living under insanitary conditions. Overcrowding, privation and fatigue are three unfortunately too often existing together amongst the poorer classes in large towns. These act by lowering the power of resistance of the system to infection. There seems every reason to believe that the continued use of an impure water supply leads to a special predisposition to diarrhoeal affections and very possibly to Cholera and Enteric Fever. Insufficient clothing acts as a predisposing cause chiefly in connection with chill, the exciting cause of lung and other diseases. Occupation is mentioned as a frequently occurring predisposing cause ; generally it acts either through

some one or more unhygienic conditions, as overcrowding in ill-ventilated work rooms or the constant breathing of air contaminated with some irritant material.

Exciting Cause :—The exciting causes of infection are the micro-organisms or bacteria. Now where do these bacteria come from ? The bacteria are always present in the environment of animals and human beings and in the air, soil, and food-stuffs, etc., some find constant lodgment on various parts of the body. The mouth, the nasal passages, the skin, the upper respiratory tract, the conjunctivae, the ducts of the genital system and the intestines are always inhabited by numerous species of bacteria, which while subject to no absolute constancy, conform to more or less definite characteristics of species distribution for each locality. Thus the Colon organisms are invariably present in the normal bowel, Bacillus Xerosis in many normal conjunctivae, Staphylococcus, streptococcus, various spirilla and pneumococcus in the mouth ; therefore in contact with the bodies of animals and man, there is a large flora of micro-organisms some as constant parasites others as transient invaders, some harmless saprophytes and others capable of becoming pathogenic. It is evident therefore that the production of an infection must depend upon other influences than the mere presence of the micro-organisms and their contact with the body ; and that the occurrence of the reaction is governed by a number of important secondary factors ; for the phenomena of infection are in reality reactions between the germ and the body defences.

Bacteria (*or micro-organisms*).—

They are roughly divided into two classes: saprophytic and parasitic. The saprophytes are those that live best on dead organic matter, animal or vegetable ; they perform the important function of reducing the excreta and dead bodies into simple chemical substances which may again be utilized by the plants in their constructive processes. Therefore they are putrefactive and not able to invade the tissues of living animals or plants. Parasites on the other hand are such as are able to thrive upon or within the living organism or a plant. Some are without any harmful effect, *i.e.*, non-pathogenic and others are disease-producing, *i.e.*, pathogenic. Broadly, from an hygienic point of view all bacteria may be divided into pathogenic, and non-pathogenic. The following micro-organisms are almost always pathogenic for the respective diseases :—

Staphylococcus Pyogenes { Aureus. Flavus. Citreus.

pus-forming organism, *e.g.*, in suppuration, boil, carbuncle, etc.

Streptococcus pyogenes, also pus-forming organism and in erysipelas, septicaemia, &c.

Diplococcus gonorrhœæ of Neisser producing gonorrhœa.

Diplococcus pneumoniae or lanceolatus of frænkel producing croupous pneumonia and occurring also in meningitis and various other inflammatory conditions.

Bacillus tuberculosis of Koch producing tuberculosis.

Micrococcusmelitensis producing Malta fever.

Bacillus anthracis producing anthrax disease common in animals.

Bacillus leprae producing leprosy.

Bacillus mallei producing glanders disease common in horses.

Bacillus diphtheriæ, of diphtheria, disease common in children.

Bacillus influenzae of influenza.

Bacillus pestis of bubonic plague.

Bacillus oedematis maligni (of malignant oedema).

Bacillus Tetani (of tetanus.)

Bacillus Typhosus of Eberth (typhoid fever.)

Spirillum Obermeieri (relapsing fever.)

Cladothrix Actinomyces (or actinomyces bovis.)

Micrococcus Intracellularis Meningitidis (Meningococcus) of Weichsel baum (cerbro-spinal fever.)

Bacillus Coli Communis (various inflammations).

Bacillus Enteritidis, bacillus enteritidis sporogenes and bacillus Botulinus (food poisoning.)

Spirillum cholerae (cholera.)

Cladothrix Madurae (mycetoma.)

Plasmodium malariae (malarial fever.)

Amoeba Coli (variety of dysentery.)

Leishman—Donovan bodies (Kala Azar disease.)

(to be continued.)

RAMBLES.

"EVEN THE RED SEA ALSO."

By Echo.

THE nurse opened her letters carelessly but when she came to the third or fourth she gave a shout of joy and tossed it over to me.

"What's the matter?"

"A booking for July."

"You are not so hard up surely? You know you hate this sort of case. Why do you go? Why this excitement?"

"Everyone hates them. It's the getting up at night. But this—this is splendid. Of course I'll go!"