Hudson river water according to Prof. Perkins shows steadily increasing contamination from Schenectady to Albany. At Albany the water commissioner has condemned Hudson water as unfit for use and *drive* wells are being tested. Ice supplies tested have similarly shown increasing impurities. We thus see that a time arrives in the history of the growth of towns and cities on rivers at which pollution can be calculated, and its dangers positively estimated. In England the Alkalies Acts long since set limits to the practice, and out of this law, under the able administration of the late Prof. Angus Smith, have arisen some of the worthiest scientific experiments, and, at any rate partial, solutions of questions thought almost too large to touch.

Surely the *Naiades* must have vanished from the streams through some such profanation by sewage of the limpid waters of their fairy abodes, and may it not be that

> " The great god Pan Down in the reeds by the river,"

indulged in somewhat too much of the erst crystal stream and through a fatal typhoid supplied a subject for the dirge,

" Pan. Pan is dead !"

## HOUSE-WARMING.

THE discussion of this question of vital importance both to the comfort and health of every one becomes of special interest at this season of the year. Not only is every one asking by what means can heating be done most economically, but he also wishes to feel that such economy is compatible with the highest possible degree of health. To us as physicians, however, the matter becomes one of paramount importance, since upon methods of heating we shall have to look for causes of ill-health not otherwise very well explainable, and must endeavor in such cases, to explain some of the details of improvment in house warming.

Speaking generally, there are three principal conditions in the atmosphere of rooms in which, under even so-called good heating, there are great variations from the normal external air. They are (a)purity, (b) distribution of temperature, (c) moisture. Doubtless they are all intimately associated; but a few remarks on each will not be out of place.

Purity of house air.-When we remember that

the general rule of ventilation, as set down by De Chaumont and others, limits the changes in the air of a room to six within the hour, if draughts are to be prevented, it is apparent that the air must be of a wholly different nature from that outside when at an ordinary breeze of six miles an hour the air about a person would be renewed 30,000 times. But when we further consider that it is only with best systems of ventilation that the air of a room is changed thus often, it is evident that impurities in the air of rooms are invariably present, and often in large degree. Carbonic acid from the lamp, from gas-lights and base-burners; carbonic oxide from stoves and super-heated furnaces; organic emanations of a particulate character, and bacteria from impurities in the rooms and under them, are all measurably present. As a single instance, Miquel states, that while the outer air of Paris had during three years the following relative number of microbes, viz. : autumn, 121; winter, 52; spring, 10, and summer, 92, per cubic metre, the number in Salle Lisfranc of L'Hôpital de la Pitié were during 1881, 1882, autumn, 56,700; winter, 52,800 ; spring, 32,300 ; summer, 19,300.

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Distribution of temperature .--- In outer air in cold weather we notice within a given space no change of temperature apart from unequal exposure to wind; but within doors it is different. The air of a room as ordinarily heated in winter will show a difference of from 10° to 20' F. between that at the floor level and six feet above. Again, while the air along an inner wall may be at 66°, that near the window may be near freezing point and that near the ceiling at 80° or 90°. When it is remembered that the ordinary stove or grate may utilize an hundred cubic feet of air per minute, it is apparent that it must be replaced in the room by air being drawn along the floor, through cracks in the floor, etc., draughts of a most dangerous nature being thus created. These great differences of temperature, even in small rooms, are the cause of equally important differences in the relative humidity of the air of the room.

Moisture.—In external air the relative humidity or degree of moisture is about 75 per cent. of complete saturation. Since the capacity of air for moisture is doubled with every  $27^{\circ}$ , it is apparent that if house air at 66° has normal humidity, a reduction of temperature of  $20^{\circ}$  must raise it to near saturation point. Conversely if external air at or