addition, it has entered into an arrangement with the Gas Light and Coke Company, whereby the latter operates the Fuel Research Board process under commercial conditions at its Richmond works. The results are to be published, and should give a good idea of the commercial status of such processes.

Other processes which have reached a working scale in Great Britain were discussed by Dr. Lander. Experience with the process of coal hydrogenation was discussed, but the results do not suggest any immediate possibility of competing with mineral oil at present prices. A most interesting discovery is the possibility of converting a non-coking coal into a strongly coking product by the addition of less than 1 per cent of hydrogen.

Processes for the synthesis of fuels from water-gas do not seem to have any immediate commercial possibilities, although high-priced products such as methyl alcohol are already being made by such methods.

The three lectures give a concise amount of the scientific and technical work on the treatment of coal and the nature of the problems under investigation and awaiting solution in Great Britain.

H. J. H.

Ventilation.

IN a recent lecture before the London and South-Eastern Counties Section of the Institute of Chemistry, R. C. Frederick discussed some of the problems involved in securing adequate ventilation under various conditions. He also reviewed some of the work (to which he has himself contributed) which has already been carried out towards their elucidation.

Air is vitiated by abstraction of oxygen and by the addition of carbon dioxide, aqueous vapour, heat and bacteria, when human beings are congregated in an environment with poor ventilation. The most useful index of inadequate ventilation is the percentage of carbon dioxide present; but the discomfort experienced is not due to accumulation of this gas or to decrease in the oxygen since the greatest changes found are entirely without physiological influence. A poison in expired air has never been demonstrated; so that it is to the physical conditions of the atmosphere that one must turn for an explanation of the stuffiness of a confined environment.

Temperature, especially that registered by the wet bulb, humidity and air movement are the important factors. In estimating the degree of comfort to be expected, the cooling power of the atmosphere is of great importance: for its estimation Hill's kata-thermometer may be used. In America, Yaglou and his co-workers have developed the idea of 'effective temperature': with varying combinations of temperature, humidity, and velocity of air movement there is the same effect on the rate of heat loss from the body, and therefore the same sensation of comfort, or the reverse, and the same physiological response. The 'comfort' zone extends between 63 and 71 effective temperature. The results are not strictly applicable to conditions in Britain, since we are accustomed to somewhat lower temperatures.

Finally, there is the psychological or personal factor to be considered: if an occupant of a space believes the ventilation to be unsatisfactory he will suffer discomfort. Again, fresh air appears to exert a tonic effect as compared with washed and filtered air, and also to lower the incidence of minor respiratory disease. The reason for this effect is at present unknown and should form the subject of future research.

Calendar of Patent Records.

September 22, 1856.—The invention for which a patent was granted to Robert F. Mushet on Sept. 22, 1856, was very largely responsible for the immediate success of the Bessemer steel process. By the addition of from one to five per cent of molten spiegeleisen to the iron treated by the Bessemer process, Mushet regulated the supply of carbon and restored the small amount necessary for the production of steel. Mushet received little recognition at the time, and his patent did not run its full course. He was awarded the Bessemer gold medal of the Iron and Steel Institute in 1875.

September 24, 1921.—An important patent for the indiarubber industry was that granted to Paul Schidrowitz on Sept. 24, 1921, for the direct vulcanisation of rubber latex without coagulation, which enabled a vulcanised rubber in liquid form to be obtained without the necessity of a costly series of operations and expensive solvents.

September 25, 1791.—Cheap soda, for which many industries were waiting, was first produced under the process invented by Nicholas Leblanc and patented by him in France on Sept. 25, 1791. The manufacture did not become established in Great Britain until the repeal of the Salt Tax in 1823 reduced the price of salt (cf. Calendar of Patent Records, July 31).

September 26, 1836.—One of the inventors who contributed to the success of the Birmingham papier-mâché industry introduced by Henry Clay in the second half of the eighteenth century was William Brindley, paper maker. His invention for making papier-mâché articles in dies, of which the patent specification was enrolled on Sept. 26, 1836, received an award at the Great Exhibition of 1851.

September 26, 1867.—The first publication of the modern dry 'contact' process of filtering and deodorising mineral oils in which finely divided fuller's earth is mixed with the oil and the mixture subjected to constant agitation and heat, appears in the provisional specification of John Fordred, a London chemist, filed with his application for a patent for bleaching and purifying paraffin, dated Sept. 26, 1867. The patent was not sealed, but Fordred obtained later grants in which the process was applied not only to paraffin, but also to hydrocarbon oils and animal and vegetable oils and fats.

September 27, 1822.—One of the earliest improvements on the stop-watch—the construction of which in those days necessitated the stopping and restarting of the whole mechanism—was that patented by Frederick Louis Fatton, of London, a pupil of Breguet, on Sept. 27, 1822. Fatton's watch had a centre seconds hand working on a dial at the back of the case and having mounted on it apparatus capable of making a distinct mark, in ink or pencil, on the dial at any required moment, a button on the case serving to operate the mechanism without interfering with the going of the watch.

September 28, 1836.—One of the first-fruits of the introduction of the hot-blast for iron smelting was the solution of the problem of the use on a commercial scale of anthracite in the blast-furnace. The first successful production of pig-iron with anthracite was made at Yniscedwin, in South Wales, by George Crane in 1837, and the process was rapidly adopted both in Great Britain and in America. Crane's English patent for the use of anthracite with the hot-blast is dated Sept. 28, 1836. A United States patent for the same process had been granted to Dr. Geissenhainer in 1833, but no large-scale production there was made until Crane bought the patent rights and improved the process.