action indicating that sufficient alkali has been provided, and if the reaction does not become more alkaline than this there seems to be no danger of injuring the kidney.

Of course this method may be inadequate to cope with the more complex problems of diabetic acidosis, and it is very doubtful if the alkali can always penetrate in sufficient quantities to the seat of acid production. There is, moreover, no reason to suppose that it can influence the cause of the condition. Indeed this is rather a matter of proper feeding than a therapeutic measure. For next to water and sodium chloride the concentration of sodium bicarbonate is the greatest in blood, and it seems not unreasonable to care for a sufficient supply of this substance as one does for a supply of water.

There is the more reason for bearing these conclusions in mind because acidosis is one of the commonest of pathological states. Indeed I think that it is probably more common than fever. Therefore one may conclude that in serious illness the test for acidosis should always be made, especially because it is often a very simple matter to repair the defect. And I think there is some reason to suppose that such action may occasionally be of the greatest importance.

But the use of alkali must always be deliberate and founded upon the urinary reaction, for too much alkali may be very harmful indeed. As employed by Martin Fischer in nephritis, experience has convinced me that it is a source of grave danger and, if possible, graver suffering to patients who can often expect from the physician little more than some relief from pain. Yet even in nephritis there is at present no reason to avoid the proper use of alkali. In fact, I have never known a kidney to be unable to excrete a small excess of it, and I think that we may therefore always undertake the administration of soda according to the rule above laid down, with the conviction that when the quantity of sodium bicarbonate in the body is below normal, no harm is to be expected from the action of sodium bicarbonate.

Finally, if I may be permitted to express as a precept my own conclusion of the bearing of all these intricate facts upon medical practise, it is as follows: The duty of the physician is to discover that the quantity of sodium bicarbonate in the blood is diminished, to restore that quantity to normal, and to hold it there. But while restoring it, he must never increase the quantity above normal. Thus founding practise upon exact knowledge, upon theory fully confirmed, and upon an understanding, however imperfect, of the organization of all the manifold processes of metabolism, he may hope sometimes to block a cycle of changes leading to final disintegration, and perhaps more often to alleviate discomfort and pain.

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SCIENTIFIC EVENTS

THE IRON INDUSTRY

ABNORMAL conditions prevailed in the iron industry during the first half of 1917, mainly on account of the war in Europe. At the beginning of the year, when pig iron was being made at the average rate of about 102,000 gross tons daily, the blast furnaces were operated at slightly reduced capacity, according to E. F. Burchard, of the Geological Survey. This rate dropped to less than 95,000 tons daily in February, but in March the rate rose to 105,000 tons daily, and in April and May it stood at more than 110,000 tons, compared with the maximum rate of 113,000 tons in October, 1916.

The prospective blast-furnace capacity seems not to have kept pace with the demand, however, as is indicated by the enormous increases in price, especially since the United States entered the war.

The total output of coke and anthracite pig iron in the first five months of 1917 was about 15,800,000 gross tons, compared with about 16,175,000 tons during the corresponding period of 1916, a decrease of about 2 per cent.

The quantity of iron ore from mines in the Lake Superior region shipped from upper Lake ports from January 1 to June 1, 1917, was about 6,500,000 gross tons, compared with slightly more than 10,100,000 tons for the corresponding five months of 1916, a decrease of about 3,600,000 tons, or more than 35 per cent. This apparently large decrease in ore shipments from the principal producing region was not due to inability to mine ore but largely to the belated opening of Lake traffic because of ice blockades and to many ore-carrying boats having been put out of commission through accidents.

Plans are being made by committees of the Council of National Defense to increase shipments of iron ore, coal and coke during the remainder of the season through cooperative methods, and possibly the June shipments will nearly equal those of June, 1916. In the meantime the blast furnaces have been drawing on large stocks of ore at lower Lake ports in order to offset the deficiency in upper Lake shipments. Deferred shipments of coke and other causes of traffic congestion have also retarded operations at some furnaces.

Prices of pig iron at western Pennsylvania furnaces have advanced since January 1, 1917, 61 to 77 per cent. and since a year ago 134 to 200 per cent. On July 3, 1917, basic iron was quoted at Valley furnaces at $52 a ton, Bessemer iron at Pittsburgh at $57.95, and No. 2 foundry iron at $55, while at Birmingham, Ala., foundry iron, which one year ago sold at $14 brought $47 a ton. Low-phosphorus iron has been quoted at $70 to $80 a ton. Feverish buying of pig iron by private consumers who were endeavoring to provide for their present needs, as well as for their needs far into 1918, has caused much of the recent increase in price. The extent of the government's war needs for steel is not yet defined, but increasing. Orders are being placed slowly, however, and they should not interfere seriously with deliveries of steel to private consumers. As the government is not competing in price it would seem that there may be at least some warrant for belief that prices may eventually adjust themselves without need for further great inflation.

METEOROLOGY AND AERONAUTICAL ENGINEERING[1]

Introductory: Importance of meteorology in aviation; aircraft and weather in war: (*a*) general climate; (*b*) weather and weather forecasts: military field meteorological services.

The Atmosphere: Composition; height; "troposphere" and "stratosphere": general characteristics of each.

Temperatures in the Free Air: Vertical temperature gradients; temperatures at various heights; inversions; stable and unstable conditions in relation to flying.

Pressure: Importance; comparison with water; decrease with altitude; physiological effects of diminished pressure; measurement; mercurial and aneroid barometers and barographs: use, errors, corrections; determination of altitudes by means of barometers; isobars; pressure gradients.

The Wind in Relation to Pressure at Earth's Surface: Wind direction; deflection of winds from gradient: earth's rotation and friction; cyclonic and anticyclonic wind systems; "gradient wind;" Buys Ballot's Law; isobaric types. Wind velocity; general relation to gradient; Beaufort Scale and its equivalents in force and in velocity in miles an hour; anemometers; Robinson and Dines; gustiness of wind.

Conditions of the Atmosphere Affecting Aviation: General and Local: (*a*) general air movements, essentially horizontal; atmospheric

[1] Syllabus of ten lectures on Meteorology given in the course in aeronautical engineering at the Massachusetts Institute of Technology in cooperation with Harvard University, by Robert De C. Ward, professor of climatology, Harvard University.