being a body in a state of very unstable equilibrium, and very prone to oxydation. The odour of terebene is far from being disagreeable; in mass it is somewhat terebinthinous, though quite distinct from that of turpentine, and is generally said to smell like oil of thyme or oil of cinnamon; but, when diffused through the air, in which condition it probably soon passes into incipient oxydation, it has an aroma quite peculiar, and not at all unlike that of fresh pine-wood, of the odour of which wood it is not at all improbable that terebene is the cause. At any rate, terebene possesses the same powers in a very active degree; and that it evolves ozone or else peroxide of hydrogen, may be shown by its producing the characteristic effect on tincture of guaiacum and blood-solution.

It is not inappropriate, in connection with this fact, to note that attention has lately been drawn by several writers, especially by Dr. Day of Geelong, Australia, to the ozonising properties of pine-wood, and to its value as a material for the construction of hospitals for infectious disease. In fact, Dr. Day attributes to it disinfecting powers of a high order. That it possesses very efficient deodorising properties, is within the observation of any one who has noticed the effect which fresh pine sawdust has on offensive masses; but that it is in any true sense a disinfectant is, for the reasons given above, I think more than doubtful.

To the compound above described, I give the name of *cupralum*. For crude deodorising purposes, where the coarser results of decomposition, such as sulphuretted hydrogen and ammonia, have to be neutralised, I combine a mixture of the sulphates of iron and alumina, with a mixture of carbolic acid and terebene. To this compound, which will be found effective for a variety of purposes, such as the deodorisation of drains, cesspools, urinals, etc., I give the name *ferralum*.

THE TEMPERATURE OF PHTHISIS.

By C. THEODORE WILLIAMS, M.D., F.R.C.P.,
Physician to the Hospital for Consumption, Brompton.

THE questions put to me on the temperature of phthisis by Dr. Edward Mackey, in the last number of the JOURNAL (February 13th), are of such importance, that I lose no time in replying to them, although I could have wished for a still larger accumulation of material than my 104 cases before I laid down definite laws on the subject.

Dr. Mackey asks for a further expression of opinion from me on the average frequency and character of the cases where tubercle forms without any rise or fall of temperature, and quotes some of Dr. Ringer's propositions: viz.: 1. There is probably a daily elevation of temperature in all cases where a deposition of tubercle is taking place in any organ; 6. By means of temperature (rise), we can in many instances diagnose tubercularisation long before physical signs were sufficient; 8. It is probable that, by means of the temperature (non-rise), we can conclude that the deposition of tubercle has ceased.

Of my patients, twenty-six were active first stage cases, in which no cavities existed, or any suppuration was proceeding, and the formation of tubercles was the only evident lesion. They thus, perhaps, afforded better opportunities of ascertaining the thermic phenomena accompanying tubercle formation than the more or less advanced cases to be found in a general hospital, and than Dr. Ringer's, in some of whom excavation had already taken place; for it is obviously of importance to exclude the phenomena of suppuration as far as possible.

In seventeen of the above twenty-six, a rise of temperature accompanied the formation of tubercle; the rise took place in the afternoon, invariably subsided at night, and was followed by normal or subnormal morning temperature. In some, the rise preceded the physical signs, in others it did not. In nine of the above cases (more than one-third), no rise was perceptible, though it was carefully watched for, the observations, as Dr. Mackey must have seen from my paper, being taken very frequently. In five out of the nine, subnormal temperatures prevailed, yet here the process of tubercularisation was traced day by day and step by step with the stethoscope; of these cases, two are narrated in my paper, one in which development of tubercle took place, and the other where a distinct extension of the tubercle-formation was detected.

These patients presented no striking clinical features, and their cases afterwards followed the course of chronic phthisis. The amount of consolidation seemed to bear no relation to the temperature. Five of the nine had one lung affected; four had both lungs involved. In one, active tuberculosis was taking place in both lungs. Some of the patients belonged to that category of cases where the early symptoms are so often mistaken for those of bronchitis, the tuberculosis being accompanied by wheeze and sonorous rhonchus, with frothy expectoration. All doubt as to the presence of consumptive disease was set at rest by

the appearance of subclavicular or suprascapular dullness. Valuable evidence confirmatory of my cases, and exhibiting the frequency of low temperatures in early phthisis, will be found in Surgeon Nathaniel Alcock's very able essay on the Nature and Varieties of Destructive Lung-Disease included under the head of Pulmonary Consumption (*Army Medical Reports*, 1873). My large opportunities at the Brompton Hospital have enabled me to collect and analyse the greatest number (as far as I know) of temperature-records of phthisis; and I do not hesitate to affirm that their evidence is not in accordance with Dr. Ringer's first and eighth propositions, nor, again, with this paragraph: "Admitting an elevation of temperature in all cases of tuberculosis and catarrhal pneumonia, it follows that, if the temperature be normal, we may conclude the patient is free from these diseases." Dr. Ringer's cases were, I believe, fewer than my own, and by no means so free from complications; but I do not doubt that so competent an observer, if he had had the same field for watching early phthisis, would have arrived at much the same conclusions on this subject as myself.

The old idea, that the formation of tubercle is invariably accompanied by rise of temperature, is untenable; and the question arises, in cases where high temperature is present, whether it may not be caused by the presence of pneumonia set up by the tubercle rather than by the tuberculosis itself? If the whole temperature-course of phthisis, in all its forms and stages, be surveyed, it will be apparent that low temperatures are as much, if not more, a characteristic of the disease as high temperature; and, if Dr. Mackey require a temperature-test for tuberculosis, he will be more likely to find it in (1) the fall of temperature at night, (2) low records of the early morning; or, when a rise takes place, not in the fact of the rise, but in the period in which it takes place, viz., in the afternoon, and in the rapid fall of the temperature towards night.

As I have recently laid a considerable mass of evidence on the subject before the profession in my paper read at the Royal Medical and Chirurgical Society on January 26th, and as I am preparing another, dealing with the effects of various accompaniments of phthisis on the temperature, I will not trespass further on the space of the JOURNAL. The joint work on *Pulmonary Consumption* by my father and myself contains little mention of diagnosis by temperature; for, at the time of its publication, my results had not been obtained; but, in a future edition, the question will be duly discussed.

PRELIMINARY NOTICE OF EXPERIMENTS ON THE PHYSIOLOGICAL ACTION OF JABORANDI.

By J. N. LANGLEY, B.A., St. John's College, Cambridge.

DR. FOSTER, having received from Dr. Ringer, through Mr. Martindale, a small quantity of the alcoholic tincture and glycerine solution of the alcoholic extract of jaborandi, placed the drug in my hands, and requested me to observe its physiological action. I have been able to make some observations, which are confessedly very incomplete; but I am induced to publish them, since they seem to have some interest, and because I shall be quite unable to resume them until after the close of the term, it being practically almost impossible for me to pursue any serious investigation while the class-teaching is going on.

1. *Effects on the General Nervous System.*—Injected beneath the skin of the frog, jaborandi causes tetanic convulsions not unlike those of strychnia. These continue when the brain has been removed, but do not appear after destruction of the spinal cord. The mechanism of their production is, therefore, not peripheral, but central and spinal. In two dogs which had previously been placed under the influence of morphia, and in two rabbits to which chloral had previously been given, no such convulsions were observed. The difference between the frog and the mammal may have been a question of dose. To settle this, further observations are necessary. I could find no marked effect on the irritability of the motor nerves or of the muscles; but on this point, also, I speak with reserve.

2. *Effects on the Circulation.*—In the dog (under morphia) and in the rabbit (under chloral), injection of jaborandi into the jugular vein was followed almost immediately by a distinct slowness of the pulse-rate. No initial quickening (Dr. Ringer observed quickening of the pulse in the human subject) was observed. This, again, may be a question of dose, and of rapidity of entrance into the circulation. The pulse was brought down to as much as one-third of its previous rate. The effect in the case of the rabbit came on very rapidly, soon reached a maximum, and then speedily diminished.

During the height of the effect, stimulation of the pneumogastric

nerve produced the ordinary inhibitory results, the heart being brought to a diastolic standstill, and resuming its beat afterwards on the cessation of the stimulus.

In the frog, the slowness of the heart's beat was carried to actual stoppage, the heart remaining motionless and distended in diastole. While the animal was in this condition, the injection of atropine brought back the rhythmic beat.

We may infer from this, that the action of jaborandi (like physostigmin) in rendering the heart's beat slow, is through stimulation of the inhibitory fibres of the pneumogastric. The jaborandi, however, apparently, while exciting, does not rapidly exhaust the inhibitory fibres.

An attempt was made to recall in a frog, by the injection of jaborandi, the inhibitory power of the pneumogastric nerve, which had been suspended by the action of atropine. This, however, failed.

In the dog and the rabbit, this slowness of the pulse-rate was accompanied by a fall of blood-pressure, distinct, but not of any very great extent, coming on rapidly; in the case of one rabbit, causing a descent of the pressure-tracing almost imitating the effects of stimulation of the pneumogastric.

If the web of the frog's foot be examined while jaborandi is injected beneath the skin of the back, the arteries are seen to dilate, and the capillaries and veins to become full and red. The rapidity of the flow of blood, in spite of the dilatation, diminishes very considerably, so much so, that eventually a nearly complete, or even quite complete, stasis is observed over the greater part or whole of the web. This may be seen not only when the heart is at a standstill, but also when it is beating as rapidly as twenty times a minute. When the heart is revived by atropine, the stasis gives way, but only partially, and a very slow imperfect circulation is set up again. This same stasis was observed both when the sciatic nerve was left intact, and when it had previously been divided. Speaking under all reserve, and in view of future observations, I am very much inclined to believe that the stasis cannot be wholly due to the action of the jaborandi on the heart and vaso-motor nerves, but that a direct influence, of some kind or other, is exerted.

Injected into the jugular vein of a rabbit in which the sympathetic nerve of one side had been divided, jaborandi caused first of all a contraction of the vessels of the ear on the side where the nerve had been divided. This contraction was followed by a dilatation. A second injection caused a second contraction, succeeded again by dilatation. Under the full influence of jaborandi, stimulation of the divided sympathetic caused contraction of the vessels and pallor as usual.

After the injection of jaborandi, the vessels of the ear on the side on which the sympathetic was intact were dilated, but apparently not to the same extent as on the other side.

Paralysis of the normal vaso-motor influence does not, then, seem to be one of the most prominent characteristics of jaborandi.

The tracing of the blood-pressure was remarkable for the great flattening of the respiratory curves, a flattening which could not be explained by changes in the respiratory movements. This change in the respiratory curves, added to the bold pulse-curves of the slowly-beating heart, gave very distinct features to the tracing.

3. *Effects on Secreting Organs.*—In the dog and rabbit, very soon after the injection of jaborandi, a thick viscid mixture of mucus and saliva dropped from the mouth. A clear fluid ran from the eyes and nose. When a cannula was placed in the submaxillary duct, a flow of saliva, having the characters of chorda-saliva, took place very soon after the injection of jaborandi. The secretion speedily reached a maximum, and then declined. This excitation of the gland was but little, if at all, affected by previous division of the chorda tympani, and it was, therefore, peripheral in its mechanism. After the injection of jaborandi, electric stimulation of the chorda tympani caused an increased secretion, but quite out of proportion to the flow caused by a similar stimulation before injection. In fact, the jaborandi appeared rapidly to exhaust the gland.

In the frog, jaborandi caused a viscid secretion from the mouth and from the whole surface of the skin. Division of the sciatic produced no marked effect on the secretion from the skin of the leg; but this point also requires closer examination.

In the dog, there was found, after death, a large quantity of mucus in the trachea and bronchi, and a considerable amount of acid fluid in the stomach.

Jaborandi apparently increases the peristaltic action of the intestines, and in some way affects the urinary apparatus; but on these points, as also on its influence over the eye, the liver, and the secreting powers of the kidney, I have as yet been unable to make any precise observations.

In conclusion, I would point out that jaborandi in many points is similar in its action to physostigmin, but yet has distinct characters of

its own; that its action on the heart may be regarded as indicative of the care with which it should be employed therapeutically for the sake of its other qualities; and that its effect on secreting tissues—for example, the skin—and its peculiar action on the general circulation, present physiological problems of very great interest. To these I hope to be able before long to return. Of course, an isolation of the active principle, or of the active principles—for there may be more than one—is much to be desired.

EXCISION OF THE UPPER HALF OF THE FIBULA WITH A CARTILAGINOUS TUMOUR.

By THOMAS ANNANDALE, F.R.S.E.,

Surgeon to the Edinburgh Royal Infirmary, and Lecturer on Clinical Surgery.

A. D., AGED 30, was admitted under my care on March 17th, 1873. Four years before, the patient had a cartilaginous tumour removed from the upper part of the fibula; but none of the bone was taken away, the growth being simply torn from its attachment to it. The part remained well for about two years; but after this the growth returned, and continued gradually to increase in size.

An examination determined the existence of a tumour as large as an infant's head, firmly attached to, and evidently growing from, the upper half of the fibula. It was firm to the touch, somewhat lobulated, and projected principally inwards towards the popliteal space and calf of the leg. There was a cicatrix near the head of the fibula, the result, we were told, of the old operation. At first sight, amputation of the limb appeared to be the only method of successfully removing the tumour; but, after taking into consideration the nature of the growth and the site (the fibula) of its origin, I thought it might be possible to take it away thoroughly by excising the portion of bone from which it grew. The operation would necessitate the taking away of the entire upper half of the fibula; and two risks required to be avoided: (1) injury to the knee-joint in disarticulating the head of the bone; (2) injury to the popliteal vessels and nerves.

With these points in view, I undertook the operation on March

21st. The superficial aspect of the tumour was first exposed by a longitudinal incision about six inches long, made on the outer edge of the fibula, and by a shorter transverse one passing inwards across the calf at right angles to the centre of the first. Portions of several of the muscles were adherent to the growth, and required to be dissected off or cut across. The posterior tibial artery ran along a groove in the