

splintered parts are bright, lustrous, and non-ochreous, exactly resembling in the fractured parts the bright and unabraded implements. This fact appears to me to demonstrate that the abraded ochreous implements acquired their ochreous crust elsewhere, and were objects of great antiquity when the Canterbury gravels were laid down. I have one of these deep-brown greatly-rolled flint implements that was found amongst chert in the famous pit at Broom, near Exeter: the deep ochreous colour was not derived from chert gravel. From whence have these generally massive, abraded, ochreous implements been derived, and how laid down in distinct deposits?

As an instance of very high implementiferous gravels, the same distance south of London as the Ware gravels are north, the ancient gravels on the escarpment of the hills north of Sevenoaks and Ightham may be cited. Some of these heights exceed by 200 feet the heights of the Hertford and Ware positions.

Dr. John Evans, in his admirable book on the "Ancient Stone Implements of Great Britain," pp. 531-532, records the important discovery (on the surface) of ochreous and abraded implements at great heights near Currie Wood, a few miles south of St. Mary's Cray, Kent, at 300 feet above the valley of the Darent, and 500 feet above the sea. Dr. Evans also says (p. 531), "It is, however, necessary that further discoveries should be made in this district before it will be safe to speculate on the origin of these gravels and their relation to the superficial configuration of the neighbourhood." My friend, Mr. Benjamin Harrison of Ightham, has during the last year instituted a rigorous search over the high level gravels south of this district. A tributary of the Medway rises at Ightham, near Sevenoaks; the level of the present stream near the village is 254 feet, and an outlying bed of old river-gravel is found at 330 feet, and another bed up the stream at an altitude of from 380 feet to 400 feet. In these high-level Wealden gravels Mr. Harrison has recently found palæolithic implements *in great numbers*, generally massive, ochreous, and abraded. At 312 feet he has found them *in situ*, and on the surface as high as 335 feet. More recently Mr. Benjamin Harrison has examined the old river gravel at Dunk's Green (two miles and a half south of Ightham), and here at a level of 200 feet has proved the beds to be implementiferous. For these facts and heights I am indebted to Mr. Harrison, who has given me his permission for their publication.

In these two letters I have chiefly confined myself to statements of dry facts, purposely abstaining from any comments on the meaning of the heights, &c., referred to.

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Naval Cadet Examinations

I WISH to bring to your notice the injudicious severity to which our competitive examinations have of late attained, regardless, as it appears to me, of the possible injury they may inflict on the health of those who are forced to strain every power, both physical and mental, in the struggle.

The most recent example of the kind is, I believe, the New Standard for Naval Cadetships, which requires boys from between the ages of twelve and thirteen and a half to pass a competitive examination in Latin, French (both translating and speaking), arithmetic up to decimal fractions, algebra, including fractions and simple equations with one unknown quantity, geometry up to first twenty-six propositions of Euclid, English—with Scripture history. They are further tempted, if ambitious, to take algebra up to quadratic equations, and geometry up to the end of the first book of Euclid.

Now when the object to be obtained is no less than a career for life, one can imagine what a force of pressure—from the parent anxious to provide for his son, from the schoolmaster's pride in his pupil, and from the boy's own ambition—is brought to bear to urge nature to the utmost in the trial.

The casualties—for we are entitled to use the expression—that have already occurred under the system have been sufficiently numerous to make any one who will pause to think seriously anxious.

Education is most valuable, but when its attainment is at any time carried out at the expense of health to the pupil it is a failure. "Mens sana in corpore sano" is above everything to be prized, and he who enters upon life's work possessed of that advantage is fittest for its trials.

I will quote an extract from the *Lancet*, which treats the

subject from a professional point of view and with an admirable clearness. It says:—

"There can be no room to question the extreme peril of 'over-work' to growing children and youths with *undeveloped* brains. The excessive use of an immature organ arrests its development by diverting the energy which should be appropriated to its growth, and consuming it in work. What happens to horses which are allowed to run races too early happens to boys and girls who are over-worked at school. The competitive system as applied to youths has produced a most ruinous effect on the mental constitution which this generation has to hand down to the next, and particularly the next-but-one ensuing. School-work should be purely and exclusively directed to development. "Cramming" the young for examination purposes is like compelling an infant in arms to sit up before the muscles of its back are strong enough to support it in the upright position, or to sustain the weight of its body on its legs by standing while as yet the limbs are unable to bear the burden imposed on them. A crooked spine or weak or contorted legs is the inevitable penalty of such folly. Another blunder is committed when one of the organs of the body—to wit, the brain—is worked at the expense of other parts of the organism, in face of the fact that the measure of general health is proportioned to the integrity of development and the functional activity of the body as a whole in the harmony of its component systems. No one organ can be developed at the expense of the rest without a corresponding weakening of the whole. These faults of 'training' attain their supreme height of folly and short-sightedness when they are committed in reference to the youths destined for the public services. They are especially illustrated by the 'Regulations respecting Naval Cadets' just issued, and which will take effect in June of the present year. The work of the Civil Service Commissioners in respect to these classes of the possible servants of the State is personally and racially *destructive*. Sooner or later public opinion must recognise this fact, and then perhaps the Government or the Legislature may be moved to interpose—not before, but when it is too late."

We live in an age of reactions, when ideas are hastily adopted, hurriedly brought into practice, and fanatically adhered to. I can only hope that public opinion will recognise the danger that the *Lancet* so clearly points out, and that the Government may interpose before it be "too late."

J. D.

Flame-Length of Coal-Gas

I HAVE recently measured the flame-length of a sample of coal-gas burning in air and burning in nitrous oxide (N_2O). The flame-length in air was $\frac{1}{3}$ ths of an inch and $\frac{5}{10}$ ths in nitrous oxide. The relation of 5 to 13 is very close to what my theory would suggest, and is a confirmation of my law published in your issue of April 7.

I might add that I have recently noticed the flame of a mixture of hydrogen and nitrous oxide burning in air to develop a bright white spot about one-third from the top of the flame, and when the proportion of nitrous oxide is larger, to extend into a cone reaching to the jet. I have not examined this flame with a spectroscope, but am certain, from the whiteness of the flame, that the spectrum would be continuous. LEWIS T. WRIGHT

Water in Australia

A GENTLEMAN recently returned from Australia believes that the arid plain which occupies the centre of that island-continent might be amply supplied with water and converted into rich farm land by a very simple process. He finds his belief upon observed facts in the three sciences of botany, physiography, and geology, thus:—

1. Gum-trees and the mallee scrub flourish there. The gum-trees grow to a great size and withstand the drought of many summers. They must have water; whence do they obtain it?
2. Rivers which flow towards the centre from the mountain ranges along the coasts have no apparent outlet into the sea, but are lost in the desert. What becomes of them?
3. The underlying rock of the central plain is an almost horizontal bed of Tertiary Sandstone.

The conclusion is that the Sandstone is saturated with water and forms an immense reservoir from which existing trees draw their supplies by deep tap-roots, and that by sinking wells in the desert this water could easily be reached.

The author of this theory, wishing only to confer a public benefit, desires to bring it under the notice of scientific men,