creased the size of the work. This is somewhat to be regretted, as they are matters of quite as much importance as fixed oils, &c., to which a long chapter is devoted, and their inclusion would have certainly increased the value of the book for all general purposes.

The chapters on paraffins, terpines, and homologues of benzene are very clear, and in many cases detailed methods of assay, as, for instance, with benzene, anthracene, &c., are given that will be found of practical value.

A large chapter is devoted to the description of methods of examination of fatty oils and fats employed in the soap manufacture, and the same section also gives considerable general information respecting varieties of soap with methods in some cases improved by the author, for the analysis of soaps; in particular a tabular arrangement of analysis of a soap on p. 242.

About 100 pages are devoted to the important subject of sugars, and in this space we find an admirable condensation of methods in use, both optical and chemical, for the detection and determination of the various varieties of sugars met with commercially. The optical portion is prefaced by some short remarks on construction, and varieties of polometers in use, which might with advantage have been somewhat extended.

All the methods given in this section are up to date, and cannot fail to be of use not only to the practical man, but to the student.

The chapter on the alkaloids is also a very complete compilation of methods of detection, &c., that have been proposed and found to be reliable up to date. No doubt the book will be found valuable as a reliable compilation of methods, &c., as such, saving much time and trouble in referring to the original publications. The author is an eminently practical chemist, and in his preface to the first volume seems to deride the teaching of "ultimate organic analysis" and the "ringing the changes on the everlasting-chloro-bromo and nitro derivatives of bodies of the aromatic series."

The quality of Mr. Allen's production atones somewhat for this ebullition, for his book requires a considerable amount of theoretical knowledge to be possessed by the user; and it is very desirable, if we are to maintain a position as chemists at all, that the cant about "purely practical work" should cease, and a more thorough foundation in theoretical chemistry be imparted to students, so that they may become reliable practical men, and not mere machines for manipulating test-tubes.

Nordenskjöld's Arctic Voyage Round Asia and Europe. A Popular Account of the North-East Passage of the *Vega*, 1878-80. By Lieut. A. Hovgaard. Translated from the Danish by H. L. Brækstad. Maps and Illustrations. (London: Sampson Low and Co., 1882.)

LIEUT. HOVGAARD, of the Danish Navy, was one of the most efficient members of Baron Nordenskjöld's well-selected staff on board the *Vega*. When he returned from the remarkable voyage, he very naturally felt impelled to tell his countrymen how he had fared and what he had seen. This he has done in a pleasant and popular style, utilising to some extent the material collected by his chief. Lieut. Hovgaard, while dealing mainly with its lighter aspects, gives a fairly complete sketch of the voyage. The translation is well done, and the translator deserves special credit for the intellgible way in which he has rendered Russian names. The illustrations are not up to a very high mark.

The Sphygmograph; its History and Use as an Aid to Diagnosis in Ordinary Practice. By R. E. Dudgeon, M.D. 8vo., pp. 72. (London: Bailliére, Tyndall, and Cox).

THIS book may be of some service to beginners, as it gives rudimentary instruction in the use of the instrument, but this is all it does. The history is carelessly written, the account of the indications given by the sphygmogram is imperfect, and the deductions drawn are sometimes, we think, incorrect. From a curve in the upstroke the author concludes that the ventricular contraction is of a peristaltic character, a conclusion which would be most important if it were correct. But he does not at all take into consideration the great probability that this curve is due to instrumental error, inasmuch as it does not appear in the tracings obtained by Marey's sphygmograph, in which the connection of the writing-lever with the artery is more perfect than in Dr. Dudgeon's instrument. The chief value of the book consists in the description and directions for applying Dr. Dudgeon's sphygmograph, which certainly possesses the great advantage over other instruments, that it is much cheaper, and can be applied much more quickly, and with much less trouble.

A Great Mathematical Question. By T. Wakelin, B.A. (Melbourne: G. Robertson, 1881.)

A PAMPHLET of 16 pp., with a coloured diagram, the object of which is to show the fallacy of the *measure* of kinetic energy. It is an account of the old dispute originated by Leibnitz, and about seven pages are taken up with extracts from Whewell's "History of the Inductive Sciences" (vol. ii. pp. 68-70); *Penny Cyclopædia*, "Vis Viva"; *Encycl. Brit.*, "Energy"; Balfour Stewart, "Heat" (pp. 301-4); and Routh's "Rigid Dynamics" (pp. 260, 263, 270-1), with a reference to Todhunter's "Mechanics" (pp. 210, 211). We would suggest, as additional references, Clerk Maxwell, "Matter and Motion" (§ lxxvii.), and Tait's "Recent Advances in Physical Science." Mr. Wakelin concludes: "It will therefore be seen that the *distance* through which a body *falls* during the time of falling, is not a measure of the work of the force of gravity during that time. This, of course, means that the ordinary measure of the kinetic energy of a mass in motion is an erroneous one."

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

The Existence of a Voice in Lizards

THE letters on the existence of a voice in lizards, by M. Pascoe and S. P. Oliver, in NATURE, vol. xxv. pp. 32, 174, gave me much pleasure, being a confirmation of observations first made and published by myself in 1874, but doubted in different quarters. In my paper, "Zoologische Studien auf Capri, II. Lacerta muralis coerulea, ein Beitrag zur Darwinschen Lehre, Leipzig, Engelmann, 1874" (p. 20), I have laid down the result of my observations, in the first instance, concerning the habits of the bluish-black wall-lizard, *Lacerta muralis cærulea*, discovered by me on the Faraglione rock near Capri, and subsequently on those of other wall-lizards. There, I say: "To the harmlessness (or fearlessness, mentioned previously) of the blue inhabitant of rocks—*Lacerta muralis cærulea*—I owe the discovery of the animal's intonating capacity, a peculiarity generally ascribed among reptiles to the geckoes and chamæleons, but never observed in wall-lizards till now."

One summer-day I heard in the room where I kept a cage of lizards a peculiar sound, similar to the piping of a nestling, only softer. Having listened attentively, I was surprised to find it proceeding from the throat of one of my male blue lizards. Leisurely resting on a stone, the animal repeated the sound a dozen times, perhaps at intervals of about a quarter of a minute, each time opening its mouth a little way. For several consecutive weeks I noticed the same kind of voice in other individuals of both sexes, after which period I did not hear it for months. A series of these calls were taken down by me from ear; I give them here: "chri, bschi, riä, bi, bschiä."

Among these slightly protracted notes the ch, sch, i, and ä predominated. As to their possible meaning I am still in the dark; I was not even able to discern whether they were to express a sensation of pleasure or comfort, pain, or passion. The animals seemed to be in quite a normal condition. As I shall relate further on, I overheard afterwards a common wall-lizard of Capri, grown blind by conjunctivitis, in the act of producing the same sounds.

After it had been attempted to reject my statements, without any reasoning, indeed by declaring the voice described by me to have been the effect of a rheumatic affection of the mucous membranes, which the Italian lizards had contracted in our cold German climate, I happened to hear the same sounds from a lizard under circumstances wholly excluding every supposition as to its being an abnormal voice. I have shortly communicated the fact in my paper "Untersuchungen über das Varüren der Maueredechse, ein Beitrag zur Theorie von der Entwicklung aus constitutionellen Ursachen, sowie zum Darwinismus," in Troschel's *Archiv für Naturgeschichte*, xlvii. Jahrgang, 1881, and separately in Nicolai's Library, Berlin, 1881 (pp. 66-68), I quote the following passage :—

"In 1877, having ordered a man to search the middle Faraglione rock for lizards, I waited for his return in a little boat at the foot of the rock. After a while, the man came down with a number of captured lizards tied up in his pocket-handkerchief. I was going to take a specimen of *Lacerta muralis cærulea—Cærulescens mihi*—which he had just released, in my own hand, when it uttered repeatedly, in swift succession, a series of very sharp tones, sounding like 'bschi,' and reminding me of the hoarse piping of a mouse or a young bird."

Moreover, I mentioned that Dugès already tells us of *Lacerta Edwardsii*, a little lizard peculiar to the shores of the Mediterranean, that it is apt to utter a sound resembling the creaking of a Cerambyx. And he further reports that *Lacerta ocellata*, a large lizard of the south, when angry, will expel its breath so vehemently that a sort of voice is produced. And M. H. Landois, of Münster, at my request, informed me last year that *Lacerta viridis* was able to utter a distinctly hissing or blowing sound. These reptiles on being approached on a hot summer day, would rush furiously at their enemy, at the same time making use of their voices, so that they were distinctly heard.

Excepting the few instances above mentioned, in which the existence of voices in lizards has been observed, I am not aware of any corroborative evidence preceding that discovery, a circumstance which is easily explained by the general taciturnity of the animal, which but rarely makes use of its voice.

On the other hand, the *Tapoya Douglasii*, a kind of lizard living near the Oregon Lake, when irritated, hisses very audibly. In like manner are the Iguanas reported to hiss and blow on being caught.

TH. EIMER,
Professor of Zoology in the University of Tübingen

Sea-shore Alluvion—Langley Point

THIS spit of shingle, thrown up under the lee of Beachy Head and to the eastward of Eastbourne, is formed, like Dungeness, to windward of what was anciently a large tidal estuary forming Pemsey or Pevensey Haven. At the Roman period the mound on which stand the ruins of the castle, was washed by the sea. The windward supply of shingle forming this ness came from the beach at Brighthelmstone, a fortified town below the cliff, in Elizabeth's reign, on the site of the chain pier, gradually undermined by the sea, and not wholly destroyed until the end of the last and commencement of the present century, and the growing out of Langley Point is coincident in time with the destruction of the Brighton beach as its subsequent retreat and decline are coeval with the rapid increase of Dungeness to the leeward. In effect, Langley Point in 1736 projected three-quarters of a mile further into the sea than at present, and it is a curious fact that the breakwater proposed by the Harbour of Refuge Commission of 1840, parallel to, and one mile from the shore in Eastbourne Bay, opposite the "Wish Tower" site and the Grand Redoubt touched at the north-east end of its eastern *kant* the low-water line of 1736, as shown by the surveys of Desmaretz, the well-known ordnance surveyor of that period, but situate in three to four fathoms of water in 1840. This is a striking illustration of the amount of speculation respecting any increased area of anchorage to be obtained and maintained by artificial works in the vicinity of these shingle moles or inclosing recessions therein. In Desmaretz's time the bays west and east of this formation, viz. Eastbourne and Pevensey bays, like those now at Dungeness, must have afforded considerable shelter with three fathoms of water, now, however, reduced to one, and the area of shelter correspondingly curtailed.

Dummer's plan of 1698 shows that then the haven was open up to the castle, with the site of an old outfall about one mile west of the then entrance, which had been deflected eastward by the travelling shingle, and about this period, from its becoming constantly blocked up, the land-owners appear to have taken steps to render the drainage permanent by placing a sluice and trunk at the entrance, so that the haven has lapsed into a marsh sewer or drain.

A reference to well-known maps shows that this Ness must have advanced seaward up to a certain period, at the rate of ten yards per annum, when, however, the western supply became greatly diminished by the old Brighton beach being gradually used up, the subsequent diminution and retreat of this point afforded material for the continued increase of Dungeness to the leeward of it.

From 1724, downwards, the recession of the point has averaged over certain terms a rate of from seven to ten yards per annum, entailing the abandonment of several of the Martello Towers which fringe this portion of the coast, as well as the west fort at the Point, dismantled forty years back, also constant expenditure in heavier and deeper retaining walls in front of the fosse of the circular redoubt, at its western extremity, to check the repeated local encroachment of the sea.

It results from this continued recession of the shore that the works at the circular redoubt form an advanced point. In the early part of this century the shore in front of this work was much more seaward, and in front of particular Martello Towers in Eastbourne Bay it has retreated over certain terms of years at the rate of one yard per annum. This is shown by the known distance from the towers to high-water mark at the time of their construction. The waste since the erection of these towers has been mainly westward in Eastbourne Bay, accompanied by a certain local increase for a short distance to the eastward of the Point in Pevensey Bay, a similar result to that experienced at Dungeness.

From Dungeness to Langley Point, a stretch of thirty miles, except where intersected by harbour mouths, there is an uninterrupted belt of shingle. Over the last century an elongation of the east point (Dungeness) appears to have consumed the western surplus supply, as shown by the corresponding retreat of the western (Langley) point. The intermediate belt has with less fluctuation been driven more landward, showing that a littoral wasting away from wave action at one point is balanced by a corresponding increase at another.

The plan by Grenville Collins, 1693, shows Pemsey Haven clearly defined with two arms or branches, and a considerable entrance, but contains no notice of such a projection as Langley Point. The topographical survey by Yeakel and Gardner, 1778, a well-executed map to a scale of two inches to the mile, shows it stretching one and a quarter mile into the sea in a south-easterly direction. Of course the accuracy of the rates of progression and retrocession given above are based on a comparison of Desmaretz's surveys with those of recent date, and depend on the character of the former. The remarkable changes in the coast-line along Eastbourne Bay, its small depth, the little protection afforded by Beachy Head, and the eastward movement of Langley Point, are, as in the Dungeness case, arguments against artificial works in either of these bays.

J. B. REDMAN

6, Queen Anne's Gate, Westminster, S.W., April 29

Colour Perception

MR. HANNAY'S explanation of the colours observed in his dark rooms, seems quite in accordance with orthodox science. It is not the explanation I should myself offer, but as that would occupy too much space, and as I am conscious I should not carry the public with me, I refrain from entering on it.

What I do object to is the notion apparently entertained by Mr. Hannay, that his attempted explanation of this single phenomenon, explains also the experiments in the formation of colour I showed him. How can this explain the fact that I can show in the space of a few inches, from mixture of black and white alom, a dozen different colours side by side, mostly as clear and bright as if painted? And how does it explain the fact, that using the exact same proportion of black and white