age, and is 1.4° higher than the previous highest mean minimum, 39.4° in 1846, whilst there have only been three previous Januarys with the mean minimum as high as 39° . The mean minimum of 40.8° is in agreement with the average minimum at the beginning of May or end of October.

The lowest mean temperature for January during the last seventy-five years is 31.6° in 1879, and 31.8° in 1881, which, with January this year, gives a range of 14° for the possible mean temperature.

In January, 1916, there were three frosty nights at Greenwich, the lowest temperature being 29° on January 23, and in the last seventy-five years January, 1884, had only one frost, and January, 1872, had two frosts, whilst the other Januarys during the long period with as few as three frosty nights were 1851, 1853, 1875, and 1890. In twelve Januarys there have been as many as twenty or more frosts, and in 1879 there were twenty-six frosts. There has been no January with more than seventeen frosty nights since the memorable frost of 1895.

There were twenty days at Greenwich with the temperature 50° or above, and the nearest approach to this in previous Januarys since 1841 is seventeen days as warm as 50° in 1890, whilst there is only one other instance, in 1899, with as many as fifteen days as warm.

The highest temperature recorded at any time in January during the seventy-five years is 57° on January 28, 1843, and this temperature was reached both on January 1 and 17 this year. The two closing days of the month were the only occasions on which the maximum or highest day temperature was below the normal; the lowest maximum temperature was 42° on January 31.

There have only been two Decembers in the last seventy-five years with a higher mean than in January, 1916, the instances being 47.2° in 1852, and 45.8° in 1868, and in December, 1912, the mean was 45.7° , identical with last January. The only February with so high a mean was in 1869, the value being 45.8° .

Previous observations to those of the new series from 1841 made at Greenwich show a mean temperature of 44.6° in January, 1834, which is the highest during the last 100 years, and 1.1° lower than January, 1916.

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Lipids and Vitamines in Margarine and Butter.

IN the issue of NATURE of June 3, 1915, there is an interesting discussion on the presence of "vitamines" in butter and in margarine. The writer of the article on "Modern Substitutes for Butter" states that butter fat is the only fat or oil in which American investigators have shown the presence of vitamines, and he further states that vitamines are closely associated with lipoids, and that it is doubtful whether vitamines could be formed during lactic fermentation.

"S. H. B.," stating as a fact that vitamines are formed by lactic fermentation, concludes that butter and margarine, by being both churned with skim milk, should be equally rich in the precious substances mentioned.

Now there is no evidence about the quantities of vitamines in butter and in margarine. But recent investigations of my own throw some light on the quantities of lipoids in those substances, and with those lipoids the vitamines are closely allied. To find the lipid content, I proceed as follows:—The liquid fats, oils, butter, and margarine are shaken with an equal volume of hydrochloric acid (sp. gr. 1.19). After the separation of both liquids, part of the acid is let off and diluted with water. The precipitate of lipoids

is collected and washed with water, dried, and weighed. I found in 100 c.c. of liquid:—

Butter gr. 0.400	...	Margarine gr. 0.975	...	Sesame oil gr. 0.100
Planta (Vegetable butter) gr. 0.475	...	Klappa (Vegetable butter) gr. 0.750	...	Bran-butter (Vegetable butter) gr. 1.125
Butter-fat (Filtiated) traces	...	Olive oil (Sublime ooo) traces	...	Arachis oil (Cold pressed) traces
Coconut oil (Raffinated) traces	...	Cod liver oil (Cold pressed) traces	...	

The first conclusion from these figures is that the seat of the lipoids in butter and butter substitutes is not the fat, but the solution with which it is mixed and emulsified.

Further, it is obvious that of the ± 0.075 per cent. of lecithin in milk only a part is enclosed in the butter. The remaining lipoids in the skim milk are responsible for the greater part of the lipid content in margarine. Egg yolk, if added, may prove another source of lipoids in margarine. The high figure for margarine as compared with those for "vegetable butter" may be due to that source.

There is another store of lipoids in the seeds of plants, which is turned to profit in a recent Dutch patent process. There was a serious obstacle in the fact that lecithin enters into chemical combination (Hoppe Seyler, Juckenack), or absorption (Rob. Cohn), with albumins.¹ In order to set it free the seeds are treated with diluted acids or alkalis. "Bran-butter," e.g., is made by treating bran with diluted lime water. The solution thus obtained consists of water, gluten, lipoids, and salts. With it a mixture of arachis oil and raffinated coconut oil is thoroughly emulsified. To this emulsion is added skim milk, and the butter separated after ripening. Working on these lines a vegetable butter with 1.125 gr. of lipoids in 100 c.c. could easily be obtained. By changing the proportions a higher content may be reached if desired.

It is obvious that a "vegetable butter" of this kind in its lipid content, and probably also in its vitamine content, is more than equal to butter. As a fact, it has a most marked advantage as a part of the daily diet.

Anyone interested in the process above mentioned and its possibilities as to making butter-like, and even cheese-like products, is invited to correspond with the writer.

J. DE RUITER.

Sneek, Holland.

Science Scholarships.

THE leading article in NATURE of February 17 (p. 671) quotes Dr. Shipley and Mr. Roberts, who say, in reference to the candidates for science scholarships at Cambridge:—"No candidate in natural science who reaches the necessary standard of ability is likely to be rejected. But the supply of candidates of sufficient ability is not so great as it should be."

I have not had the opportunity of reading the original letter, but this quotation contains two points on which I may be permitted to make a few remarks. I feel entitled to ask this privilege as between 1890 and 1904 I took a share in the work of scholarship examination, and I am now able to review my work in the light of a more general experience.

First, as to the type and standard of the questions that are set to the candidates, these appear now to

¹ The absorption of lipoids by albumins could be observed by heating sesame oil with bran to 100° C., by which the oil is proved to have lost half its lipid content.

be very much the same as those in the earlier period. The school science masters claim that they have adopted new methods of teaching. Secondly, as to the supply of candidates, I feel sure if consideration is taken of all classes of schools in the country it will be found that there is a very large number of boys keenly interested in science.

I will submit two suggestions. First, that closer touch with the local education authorities is necessary. Each local authority has a director or secretary who looks after the progress of the boys in his district. The directors are acquainted with the best boys through their local scholarship schemes, and should be able to point out at once the boys likely to make progress. Selection might in certain cases be made on their recommendation only. I will not go further into this means of connecting the universities and the schools, beyond saying that something of the kind exists in certain districts.

I believe that the present form of scholarship does not recommend itself to the less wealthy, and my second suggestion is that some scholarships might take the form of free places, to include education, board and lodging, and a small money grant. I find that the fear of unforeseen incidentals deters many from the thought of a career at Cambridge. The free place should remove this fear.

My experience leads me to think that a Cambridge career under such conditions would appeal to a very much wider field than at present.

SIDNEY SKINNER.

Science in the Civil Service.

I HAVE read with sustained interest your leading article on science in the public schools and the Civil Service. The preference given to classical subjects in the competitive examinations for higher appointments in the Civil Service is patent. This might be remedied, as you appear to suggest, by a different allocation of marks to the various subjects of the examination. But are there not serious objections to the whole system of competitive examinations as applied to these appointments? I venture to suggest that the system should be ended rather than mended—"off with his head," as the Red Queen would say, with admirable directness.

With your permission, I will briefly recapitulate the arguments for such drastic treatment, which I discussed in detail in a paper read at the Teachers' Guild annual conference in January, 1913. The system tends to impose upon universities and colleges an official or bureaucratic curriculum. In so far as it fails to do this, it divides the attention of the student between his university and an external authority. The result may be illustrated from the subjects selected at the competitive examination by the first successful candidate in 1911, representing a course of study which no university in the world would willingly impose upon its students:—English composition, French, mathematics, physics, logic and psychology, moral and metaphysical philosophy, political economy and economic history, and political science. The allocation of marks to various subjects and the arrangement of candidates in an order of merit on an aggregate of marks in a wide variety of subjects must be arbitrary and unscientific. No credit can be given for original literary or scientific work, and no provision is made for the specialisation of study which, within limits, may be desirable for the future work of the successful candidates. There can be no guarantee that various types of training are fairly represented among the successful candidates. Aptitude for administrative work is in no way specifically tested. The top candidate who, from the point of view of scholarship, may

be too good, and the last successful candidate, who may not be good enough, are equally accepted. Restricted age limits are a necessary condition of the system. It does not provide fairly for the promotion of men already in the Service. It is unsuitable for women, to whom the privilege of admission to higher appointments in the Civil Service will, without doubt, be more generally conceded in the near future. Indeed, the physical and mental strain which the system entails must be harmful to men in many cases. The need for expensive special preparation handicaps the poorer student. In practice, the system works unfairly as between the students of the old and the modern universities. This is notorious, but the figures for the five years 1906–10 may be quoted. Out of 473 successful candidates, 247 (more than half) came from Oxford, and 142 from Cambridge; only five came from London, two from Manchester, and one from Leeds.

A system of selection on record by a properly constituted board would meet all these criticisms, and might be applied also to the numerous professional appointments now made departmentally. Owing to the war, such a system is already in operation for a certain proportion of the appointments to the Indian Civil Service. I have not much doubt that if the public, as represented by the universities and the learned societies, were to ask for this reform it would be granted. There would not be much official opposition, for Mr. Leathes, the First Civil Service Commissioner, when asked by the Royal Commission on the Civil Service if, supposing all ideas of the misuse of patronage were excluded, the best way of appointment would not be by selection and nomination, answered in the affirmative, provided that you could trust your nominating authority to be not only absolutely honest, but also always industrious, and to have a highly developed judgment. He thought that then, ideally, selection would undoubtedly be superior, but feared that both history and experience had proved that it was an impossible way. The war has intervened since the pronouncement, and we are now, I hope, more disposed to suppress fears and prejudices in face of facts and arguments.

T. LL. HUMBERSTONE.

21 Gower Street, W.C., February 20.

The Place of Science in Education.

SIR EDWARD SCHÄFER will doubtless carry many with him in advocating a revolution in our educational system in favour of making science the foundation of the education given in our secondary schools. But the difficult question remains as to how that can be done. In the memorandum he refers to, a definite step was proposed towards the desired end. Sir Edward Schäfer considers it a halting step, but he does not suggest any alternative course whereby the public can be led to demand that its educational house should be put in order. As one who had some small share in drawing up the memorandum, may I ask Sir Edward Schäfer what course he would like to see adopted in place of the one already indicated?

D. HILL.

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Latin as a Universal Language.

I HAVE read with interest the letter of Sir Lauder Brunton on Latin as a universal language. I sincerely hope the matter will not be allowed to drop. As a contribution, may I say that we have taught Latin here as a spoken language for fourteen years past, just as French and German are taught, and the