men of to-day are struggling hard and successfully to break down previously existing artificial walls separating different sciences, and to secure a continuous open and free field of inquiry. The most active sciences of the day have bifold names—astro-physics, physical chemistry, geo-physics, physiological chemistry, psycho-physics, social psychology, to take the first names that suggest themselves. Pick up the first authority that comes to hand upon the science of language: we read that language has two sides, meaning and form; that the explanation of meaning is a matter of psychology and of logic, while the problems of form are treated by phonetics and phonology which are a combination of physics and physiology. Turn to the committee's classification and we find that the science of language is officially recognized as a science of 'purposes,' not 'phenomena,' and hence excludes psychology. It is a science of *individual* purposes, and hence excludes logic. As a science of purposes, not phenomena, it also excludes physics or physiology or any combination of them. The case is typical, and conclusive of the fated practical inefficiency of a plan which attempts to arrange sciences—*i. e.*, branches of inquiry—according to *a priori* logic. The 'chance combinations of the university catalogue' in the laying off of the fields of inquiry may not conform to any existing 'ground plan' of metaphysical logic; but they have at least the modest merit of representing the vital activities of those engaged in the cooperative pursuit of truth and the building up of the working system of human knowledge.

The dilemma that presents itself after reading the article is the following: Either the scheme is one for presentation and discussion in literary and philosophical journals, not intended to have any influence upon the practical conduct of the Congress, or else it represents a theory of the constitution and divisions of human knowledge to which the various sections and subsections are really expected to conform themselves. In the first case, it is impossible to see why, in the *Atlantic* article, so much stress is laid upon the philosophical basis and aim of the Congress, upon the fact that it is an arrangement based not upon considerations of practical convenience, but upon a logic of knowledge. In the second case, the effect upon the Congress itself can only be disastrous. The imagining of some one invited to speak who does not accept the scheme, either in general or in its bearings upon the particular group of sciences which he is called upon to discuss, will serve as a convenient symbol for presenting the practical logic of the situation. Is he to decline because he can not accept the preordained formulations of the committee? If so, is such a result regarded as desirable from any point of view? Or is he to accept and to proceed with a complete ignoring of the 'ground plan' set forth? If so, what is the significance of the 'ground plan,' and how does the scheme in any way differ from one which should have based itself purely upon an empirical grouping of current lines of research made upon the basis of convenience?

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Concerning the Word Barometer.

To the Editor of Science: In the issue of April 3, Dr. H. C. Bolton, quoting from Birch's edition of Boyle's Works, 1744, finds the word 'barometer' first used by Boyle in 1667, and he concludes that he probably used it as early as 1665.

In the issue of May 1, Mr. A. L. Rotch shows that Boyle did use the word as early as March 24, 1665.

I have before me the works of Robert Boyle, the title page of which tells us that the work was 'Printed for A. Millar, opposite Catharine Street in the Strand MDCCXLIV.' This edition is in five folio volumes and contains a preface by Thomas Birch dated London, November 16, 1743. It is not, however, the 'Birch' edition quoted by Dr. Bolton, as the page references do not coincide.

I find Dr. Bolton's quotations given on page 28 of Vol. III., and on p. 449 of Vol. II. The paper quoted by Mr. Rotch appears twice, first in Vol. V., p. 130, under the title as given by Mr. Rotch; second in Vol. II., p. 543, un-

der a slightly different heading and with the statement, 'First printed in the *Philosophical Transactions,* No. XIV., p. 256, for Monday, July 2, 1666.'

It is, however, when we turn to Robert Boyle's correspondence that the most interesting evidence on the subject is found.

1. In a letter by Robert Boyle to Mr. Henry Oldenburg, secretary of the Royal Society, dated March 19, 1665 (Vol. V., p. 250), he says: '* * * And to answer the former first, I wonder not there should be a mistake in the barometrical paper I sent you, the haste I was in having kept me from reading it over.' This letter doubtless refers to the paper presented to the Royal Society on March 24, 1665. This is, so far as I can find, the earliest use of the word by Boyle himself. It would seem from the context that it had been used before.

2. This conclusion is supported by letters to Robert Boyle. Thus (Vol. V., p. 471) Mr. John Beal, a fellow of the Royal Society, writes to R. B. on February 6, 1665, as follows: 'Persons of no ordinary capacities do find your three discourses of thermometers and baroscopes difficult.'

3. Mr. Henry Oldenburg writes on October 27, 1664 (Vol. V., p. 314): 'I did enquire at *Gresham* about the station of the barometer and was informed * * * .' This would seem to be in response to a request from Robert Boyle wherein he may have used the same term. (This letter of R. B.'s, if it exists, is not given.)

4. The person from whom Mr. Oldenburg in all likelihood made his 'enquiry' was Robert Hooke, who at this time was a resident of *Gresham* College and much interested in barometric work. In one of his letters to Robert Boyle I find the earliest use of the term under discussion. On October 6, 1664, he writes (Vol. V., p. 537): 'I have also, since my settling at *Gresham* College, which has been now full five weeks, constantly observed the baroscopical index (the contrivance, I suppose, you may remember, which shows the small variations of the air).' That the term is new to him is evidenced by his letter of September 15, 1664 (Vol. V., p. 536), in which he uses the term 'Torricellian' where 'barometrical' might have been used, also by his return to the older usage in his letter of December 13, 1664 (Vol. V., p. 542), wherein he says: 'I have lately observed many circumstances in the height of the mercurial cylinder * * * .'

To sum up: we find during the fall of 1664 a renewed interest and experimental activity in barometrical experiments. Associated in this work were *Robert Boyle, Henry Oldenburg, Robert Hooke* and others; thus *H. O.* writes to *R. B.* on September 1, 1664, as follows (Vol. V., p. 307): "On Monday last a club of our philosophers went to *Paul's* to make experiments of falling bodies, and of pendulums; there were Sir *R. Moray, Dr. Wilkins, Dr. Goddard, Mr. Palmer, Mr. Hill, Mr. Hook;* and some of them went to the top of the steeple and let down a pendulum of 200 foot long, with an appendant weight of — lb., and found two vibrations thereof made in 15". Time would not then give leave to proceed to the other experiments that were designed; among which will also be the Torricellian; but they will be set upon within two or three days." Robert Hooke's letters show the same activity. In the letters of this period we find three persons, and perhaps four, using the term as follows: Robert Hooke, October 6, 1664; Henry Oldenburg, October 27, 1664; John Beal, February 6, 1665; Robert Boyle, March 19, 1665. All these gentlemen had the requisite linguistic knowledge to coin the new word.

I am much inclined to think that the letter of John Beal given as of date February 6, 1665, should read '1666.' I thus conclude, first from the order of the letter, preceded as it is by one of date November 9, 1665, and followed by one of date March 31, 1666, and second, from references in the letter to Boyle's papers on thermometers and baroscopes, which papers must have been those presented or published during 1665, as I find no earlier date given for any of them. It is to be regretted that no letters from Robert Boyle are given from October, 1664, to March, 1665. Indeed the discussion of the question is in-

complete without an examination of the memoirs of both H. Oldenburg and Robert Hooke.

I am inclined to think, all things considered, that a complete survey of Robert Boyle's papers, were that possible, would show him to be the author of the word. A parallel case of word-making by him is found in the following letter to Mr. Oldenburg dated September 8, 1665, in which he says: " * * * that among some hydrostatical things I was once pursuing, I bethought myself of an easy slight instrument, which I called the measuring (or steriometrical) balance * * * " (Vol. V., p. 250). At all events Robert Boyle made the first public use of the word in his papers of March 24, 1665. Strict historical priority, however, must be given to Robert Hooke. The anonymous passage in the *Philosophical Transactions,* quoted by Dr. Bolton, I should be inclined to credit to the secretary of the Royal Society, H. Oldenburg, rather than to Robert Boyle.

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SHORTER ARTICLES.

ON A NEW LILAC-COLORED TRANSPARENT SPODUMENE.

The mineral spodumene is generally known in large opaque whitish crystals, but occasionally it appears in small specimens that are transparent and richly colored. Such are the clear yellow gem-spodumene of Brazil,* the green variety hiddenite, or 'little emerald,' of North Carolina,† and the lilac or amethystine pieces rarely found at Branchville, Conn.‡ These last are plainly remnants of what must once have been elegant specimens; but spodumene is extremely subject to alteration, and has generally lost all its transparency and beauty of tint.

A notable discovery has just been made, however, of large splendid crystals of transparent unaltered spodumene, of rich lilac color, in connection with other lithia minerals, in San Diego Co., Calif. The locality is a mile and a half northeast of the town of Pala, and less than a mile from the famous rubellite and lepidolite mine at that place. Pala is already one of the most remarkable lithia localities known; amblygonite has been found there by the ton, and the lepidolite is estimated to occur by thousands of tons; while the pink rubellite crystals in the lilac lepidolite are familiar ornaments in every fine mineralogical cabinet.

At the new locality spodumene crystals occur up to the size of a man's hand, entirely clear, and of a rosy lilac tint, varying with the spodumene dichroism from a very pale tinge when looked at transversely to the prism to a rich amethystine hue longitudinally. If cut and mounted parallel to the base, these will undoubtedly yield gems of great beauty. No such crystals of spodumene have ever been seen before, and the discovery is one of extreme interest. A marked difference in color is noticeable also in these crystals, according as they come from some depth in the rock or lie nearer to the surface, the former having a deeper tint. This difference is doubtless due to the effect of air, water and light, which so frequently affect the color of minerals for some little distance into the rock. The material is exceedingly pure, with a hardness of about 7, and specific gravity (average of three crystals) of 3.183. The crystals are somewhat etched and corroded, and have a twinning, like the hiddenite variety, about the *a* (100) face; this is strikingly shown in the etched crystals, where the etching extends to the twinning-plane, and there stops.

Close to the opening, also, a splendid occurrence of colored tourmaline was found, some of the crystals being a foot long and three inches across, of rich pink rubellite with an exterior coating, or terminal caping, of dark blue indicolite.

Some similar, though smaller, crystals of transparent lilac spodumene were brought to the writer last winter, ostensibly from Hermosillo, Mexico; they were, however, found near Menchoir, California.

As this is an entirely new gem of a peculiar beauty, a name will be given to it as soon as its characteristics are definitely determined.

George Frederic Kunz.

* Pisani, *Comptes Rendus,* 84, 1509, 1877.

† J. L. Smith, *Am. J. Sci.,* 21, 128, 1881.

‡ Penfield, *id.,* 20, 259, 1880.