molecule. The bands investigated fit into the following scheme (wave-lengths of the heads) :

$n'' \backslash n'$	0	1	2	3
0	<i>3852.1</i>	<i>4102.3</i>		
1	<i>3607.3</i>	<i>3825.6</i>	<i>4068.2</i>	
	<i>3399.8</i>	<i>3592.9</i>		<i>4041.9</i>
3		<i>3398.1</i>	<i>3587.7</i>	

The seven bands given by figures printed in italics have been investigated for fine structure. Combination relations prove the correctness of the scheme.

Each band consists of two *P*- and two *R*-branches. Alternatively, the red and violet doublet components are missing. This fact, which is very striking even on a rough inspection of the plates, proves that the bands must be due to a symmetrical molecule and that the nuclear spin of the atoms in question is zero. There is therefore scarcely any other possibility but that the bands come from a C_2 -molecule, which has also been made responsible for the Swan bands. The lines are sharp and single, and our plates allow us to say with a very high degree of probability that three lines near the origin are missing. The terms can be represented with great accuracy by the usual quadratic formula: $\text{const} + B(j + \frac{1}{2})^2 - \beta(j + \frac{1}{2})^4$. All these facts show that we have here a ${}^1\Pi \rightarrow {}^1\Pi$ transition, and we believe that the electron configuration (except, of course, the orientation of the spins) is the same as that of the terms of the Swan bands.

The molecular constants calculated from these bands are very near to those of the Swan bands, but they can be obtained with much greater facility and accuracy because of the simpler structure of the bands. We give here the values of some of the constants. It is possible that the final values, which will be calculated with the help of the complete material, will be slightly different.

	B'	B''	J'	J''	ω_0'
${}^1\Pi \rightarrow {}^1\Pi$	$\begin{Bmatrix} 1.7732 \\ 1.7744 \end{Bmatrix}$	$\begin{Bmatrix} 1.6086 \\ 1.6081 \end{Bmatrix}$	15.62	17.22	1764.9
${}^3\Pi \rightarrow {}^3\Pi$ (Swan bands)	1.750	1.626	15.84	17.03	1752.4

In this table $B = h/8\pi^2 J$, J moment of inertia, ω_0 the difference between the first and the second vibrational state, and ν_0 the origin of the $0 \rightarrow 0$ band. The constant α which determines the degree of coupling of the orbital moment of momentum to the nuclear axis and therefore the 'σ-doubling' is roughly 5.9×10^3 for the initial and 1.3×10^4 for the final state.

Full particulars will be published elsewhere.

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The Muscular Sense.

IN reference to the note by Prof. Fraser-Harris on the "Subjective Demonstration of the Existence of the Muscular Sense", in NATURE of Nov. 23, I beg to point out that so far from the existence of this sense being demonstrated by the simple experiment he describes, he has really got no further than the indication of the nature of the problem. William James was well acquainted with such evidences, yet he decided that the muscular sense was a "needless encumbrance". My own position is different from both; the muscular sense, or as I call it, the sense of effort, has an existence, but the affirmation of Prof. Fraser-Harris or the denial of William James has no particular weight, as neither is based on any analysis of a searching character.

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The question is not whether a distinct sensation is perceptible in the act of raising the arm, as in the example of Prof. Fraser-Harris, but whether this sensation is determined by, and entirely explained by, the production of the efferent nervous stimulus necessary to activate the muscular system involved.

The question of the sense of effort is one of the most elusive in the whole range of psychology, and I did not find it possible to offer a definite answer until I had completed the analysis which led to the formation of the "Fundamental Processes of the Mind". Once the meaning of these processes is grasped, such problems of psychology become susceptible of solution. A complete explanation on the physical side demands a minute examination of a long series of neurological phenomena.

Nothing of this is suggested by Prof. Fraser-Harris, while on the part of William James, though he had intuitions of the necessity of ascertaining the Fundamental Processes, he has not given us even the beginning of a valid analysis to that effect. Those who are interested will find that analysis set forth with the necessary rigour in my "Principles of Psychology".

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Occurrence of *Cepedea* in Frogs.

WHILST examining a number of *Rana temporaria* for intestinal protozoa recently, I encountered one single frog infested with a species of *Cepedea* (Protozoa, Ciliata, Opalinidae). So far as a survey of the available literature has revealed, the only previous record of the occurrence of a species of this genus in *R. temporaria* is that of André (Rev. Suisse de la Zoologie, vol. 21, p. 6, May 1913), who reports the occurrence of *Cepedea dimidiata* in frogs of this species obtained in Switzerland.

The species recorded here has not yet been examined in sufficient detail to enable me to state whether it is *C. dimidiata* or not, though a cursory examination has shown it to differ appreciably in size from typical *dimidiata* obtained from *Rana esculenta*. Out of a large number of frogs obtained and examined either by me or in the course of class work, no others have shown the presence of this species; unfortunately, I have not been able to determine the locality from which they were obtained, apart from the statement that they were collected in England.

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Dec. 16.

The Secondary Split in the Maturation Divisions of Liliaceous Plants.

APPROPRIATE destaining in mid pachytene has disclosed two, and only two, rows of genes; minute bodies nearly at the limit of microscopical vision. Repeated observations have shown that the sets of four chromioles seen at late pachytene are united in two pairs, like two dumb-bells, one on each side of the primary split. Here the secondary split has not yet been completed. Observations of diplotene in *Lilium*, *Fritillaria*, *Kniphofia*, and *Allium* have proved that there is only one split visible throughout, even at the nodes. Hence I agree with Gelei, who also made an intensive study of the pachytene stage, that the primary split alone opens out at diplotene.

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Berkeley, California, Nov. 13.