0·5 μmol. per gm. of tissue[2,5]. In designing the analytical procedures, it was held that it would be difficult to prove or disprove the occurrence of such a degree of breakdown of adenosine triphosphate or phosphocreatine by direct determination of these substances, since they occur in amounts which are large in proportion to the change anticipated to take place in one twitch. It was decided, instead, to determine the possible breakdown products, adenosine di- and mono-phosphate and creatine. In addition, creatinine was also determined, although its formation would be rather improbable; finally, pyruvate was determined to cover the possibility of a rephosphorylation of adenosine diphosphate by phosphopyruvate formed, for example, from phosphoglycerate. The analyses of creatine and creatinine were carried out colorimetrically, by the Voges–Proskauer and the Jaffe reactions, respectively. All the other analyses were carried out by differential enzymatic spectrophotometry: adenosine monophosphate with adenylate deaminase; pyruvate with lactic dehydrogenase and reduced diphosphopyridine nucleotide; adenosine diphosphate by phosphorylation with phosphopyruvate and pyruvate phosphokinase, followed by assay of the pyruvate so formed. The results of assaying inosinic acid as a possible end-product (measured with 5-nucleotidase, nucleoside phosphorylase and xanthine oxidase) are still subject to some experimental uncertainty, but are in all probability negative.

In Table 1, results of these analyses are collected for various times throughout the contraction and the relaxation phases. It is seen that in no case was any significant change found in the amount of adenosine mono- or di-phosphate or creatine. Creatinine and pyruvate were likewise unchanged. Fluctuations of the individual pairs—always within 0·1 μmol. and usually within 0·05 μmol.—are entirely random, and a systematic variation of the expected magnitude is therefore excluded.

It may be said with certainty that a breakdown of adenosine triphosphate or phosphocreatine could not have been reversed by metabolism, since both aerobic and anaerobic recovery are known to occur only well after a single twitch. The experiments described were carried out anaerobically, in a mixture of nitrogen and carbon dioxide or in helium; a few aerobic experiments gave the same result.

Table 1. CHANGE IN CONCENTRATION OF THE MAIN REACTION PRODUCTS (IN μmol. PER GM.) DURING THE COURSE OF MUSCLE TWITCH

	△ ADP	△ AMP	△ Creatine
Early contraction	− 0·07		+ 0·07
	0·00		
	+ 0·04	0·00	+ 0·01
	− 0·07		
	+ 0·08		− 0·03
		− 0·04	+ 0·04
Ascending phase	− 0·08		+ 0·06
		0·00	− 0·03
	− 0·03	0·00	0·00
	− 0·06	+ 0·01	+ 0·07
		− 0·01	
	− 0·02		− 0·03
	+ 0·03		
Peak of contraction	0·00		− 0·05
	+ 0·02	0·00	0·00
	− 0·01	− 0·03	+ 0·07
	− 0·02	0·00	− 0·10
			− 0·09
	+ 0·01		+ 0·03
	+ 0·05	0·00	− 0·03
Relaxation	− 0·02	0·00	0·00
	+ 0·03	0·00	− 0·09
			+ 0·10
	− 0·19		0·00
Mean change during contraction phase	− 0·01	0·00	+ 0·01
Mean change during relaxation phase	− 0·01	0·00	− 0·01

Since we are at present investigating the possible role of other nucleotides, it is considered premature to discuss in full the possible implications of these results for our understanding of muscle. However, the possibility of a new "Revolution in Muscle Physiology"[6] is clearly discernible.

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OBITUARY

Dr. R. S. Wilson

ROBERT SHARP WILSON, Fellow of the Research School of Physical Sciences in the Australian National University, died in Canberra on October 4 at the age of thirty-eight. He was a leading member of the team working under Prof. M. L. Oliphant on the design of a 10-GeV. proton synchrotron.

Born in Lancashire, Wilson graduated at Cambridge in 1938 and continued with research in nuclear physics at Liverpool under Sir James Chadwick. Throughout the war years he was a scientific officer at the Telecommunications Research Establishment, Malvern. At the beginning he worked on the development and use of radar in night-fighters for air interception. Later he became a valued member of the Radio Countermeasures Division engaged on denying to the enemy much of the advantage of his radar and radio systems. This work had a significant effect in reducing Allied losses, both in air operations over Germany and in the invasion of Europe.

In 1945 Wilson joined Prof. Oliphant at Birmingham, where he was responsible for the radio-frequency system of the 60-in. cyclotron. While there he completed his thesis for Ph.D. (Liverpool), making an analysis of the theory of cyclotrons. In 1951 he was the first Fellow to be appointed in the Research School of Physical Sciences of the newly established Australian National University. Here he investigated the possibilities of various radio-frequency systems for the several high-energy particle accelerators that were under consideration, and at the time of his death was working on the system chosen for the 10-GeV. air-cored synchrotron. He visited laboratories in the United States and Britain in 1953 in order to study the latest developments in synchrotron design and report on the possible value to the Canberra machine of the revolutionary strong-focusing system.

Wilson was much valued for his clear thinking on policy and his fundamental approach to the physics of the problems with which both he and his colleagues were associated. He lived up to and helped to spread the best traditions of physics as taught in Britain.

Dr. Wilson has left a wife and three sons.

J. W. BLAMEY