cluding chemists. A second group consists of units which normally fill necessary civilian needs which continue during war and which are shared by the armed forces. Such are the groups producing food. Their problems are multiplied and intensified because of the war. This group of industries also needs more chemists than in peacetime. The third group consists of those producing goods which are essential neither to the armed forces nor to the civilian production army. Such units have already largely shifted over to war work. This shift is continuing at an increasing rate. Here again the need for technical help, especially of a chemical nature, is increased many fold. For instance, a peacetime company making ten-cent automatic pencils probably needs a minimum of chemical help. On the other hand, when it shifts over to making machine gun parts it certainly can not get along with less help of this kind.

Whenever we do find a chemist doing "business as usual" it is not something which we have to "tolerate" but something for which we can be thankful. This is because of the fact that, as a nation, we are hardly more than ten per cent. into total war. As we get fully into the war effort we shall need more chemists than can possibly be found or produced. Thus, the few chemists who are not yet fully in the war effort constitute our only chemical reserve. It is indeed too bad that this reserve is so small.

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d-TUBOCURARINE CHLORIDE AND CHOLINE ESTERASE

MANY have reported inhibition of choline-esterase by crude curare preparations, and recently Harris and Harris[1] have found that 0.016 mg of a partially purified curare preparation[2] will inhibit 85 per cent. of the choline-esterase activity of 0.5 cc of human serum. All preparations of impure curare, including "Intocostrin," examined in this laboratory were found to possess this choline-esterase inhibitory property. However, our recent experiments have shown that the chemically pure substance d-tubocurarine chloride is devoid of inhibitory action upon the choline-esterase activity of dog serum. It was found that 0.866 mg of d-tubocurarine chloride injected into the femoral artery of a barbital anesthetized 10 kilogram dog caused the complete curarization of the skeletal musculature. There was no change in blood pressure. *In vitro* experiments using concentrations of d-tubocurarine chloride up to approximately 29,000 times the calculated concentrations used in the *in vivo* experiments were entirely without inhibitory activity upon choline-esterase activity of dog serum. From these experiments it appears that the curare-action and the effects upon choline-esterase of the impure preparations of curare are not necessarily related.

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SPECIAL CORRESPONDENCE

ODE ON NEWTON'S THEORY OF GRAVITATION BY EDMOND HALLEY

WHEN Newton opened the printed copy of the first edition of the "Principia" in 1687, he found prefixed to the text a poem dedicated to his work and signed "Edm. Halley." It was at Halley's urging that the book had been written, and Halley had seen it through the press and paid the expenses of publication. He was then thirty years of age, Newton forty-four. The poem was in Latin like the Principia itself. It consisted of forty-eight hexameters; apart from its dedication, it bore no title.

The verses were reprinted in the second edition of the "Principia" (1713), which was edited by Roger Cotes, the mathematician, and seen through the press by Richard Bentley, the classical scholar. Bentley, without Halley's consent, altered some of the lines and omitted others. In the third edition (1726), edited by Henry Pemberton, a physician and scientist, Halley's original text was restored in most places; but a few of Bentley's changes were retained and some additional ones introduced. This text, like that of the second edition, did not meet with Halley's approval.

No further edition of the "Principia" appeared during the lifetime of Newton, who died in 1727. Both Halley and Bentley died in 1742; so that the two hundredth anniversaries of their deaths coincide approximately with the three hundredth of the birth of Newton and the death of Galileo, and the four hundredth of the death of Copernicus.

The text of all three editions of Halley's poem is printed in Stephen Peter Rigaud's "Historical Essay on the First Publication of Sir Isaac Newton's Principia," Oxford, 1838 (pages 57–59); in Sir David Brewster's "Memoirs of the Life, Writings and Discoveries of Sir Isaac Newton," two volumes, Edinburgh, 1855 (volume 1, pages 457–459); and in Eugene Fairfield MacPike's "Correspondence and Papers of Edmond Halley," Oxford, 1932 (pages 203–206).

[1] *Proc. Soc. Exp. Biol. and Med.*, 46: 619, 1941.

[2] Intocostrin. There is no evidence that the choline-esterase inhibitory activity of Intocostrin constitutes a clinical hazard.

In the following translation, made in 1923 but not hitherto published, I have used Halley's original text and have tried to follow it closely.

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TO
THIS MATHEMATICO-PHYSICAL WORK
OF THE ILLUSTRIOUS
MR. ISAAC NEWTON,
AN ACHIEVEMENT WHICH IS
THE GREATEST GLORY OF OUR AGE AND NATION

Lo! the laws that govern matter and the motions of the skies,
The Creator's computations are revealed before our eyes.
Laws that God refused to violate at creation, when his hand
Fixed them as the world's foundations, that for eons it might stand.
Now the vault of heaven discloses what its inmost mysteries are,
What the far-flung force that rotates even the most distant star.

Throned amid celestial orbs, the Sun commands them all to swerve
Toward himself, and every planet swings around him in a curve.
Every rectilinear motion is deflected by his force.
Now at last we know the secret of the Comet's curving course,
And no longer will the bearded star inspire our hearts with fear.
Now the wanderings of the silver Moon at last are rendered clear:
Why her paces are unequal, why she never would submit
To be bridled by the numbers, to be guided by the bit
That astronomers have wrought for her; we gather at a glance
Why the nodes are retrograding, why the apsides advance.
We can gauge the force with which the Moon pulls on the ebbing sea
When the broken waves, recoiling, leave the kelps and sedges free
And disclose, to watchful sailors, sands and shallows; till once more
Turning back, the heaving ocean beats and breaks upon the shore.

Cryptic questions that perplexed the mind of many an ancient sage,
Riddles over whose solution fruitless controversies rage,
We can read their answers plainly. Mathematics puts to rout
All the error that oppressed us, and the darkness and the doubt;
For the wisdom of a genius has enabled us to rise
To the mansions of the mighty gods, to scale the lofty skies.

Leave your earthly cares, O mortals; here are wider views to scan.
See how far above brute cattle is the wondrous mind of man—
Sprung from heaven, it can compass cosmic truths. And even he
Who, by written tablets, outlawed murder, theft, adultery,
And the bearing of false witness—though he guided men aright,
Did not elevate the human race to such a lofty height.
Nor did he who first prevailed on wandering tribes to settle down
And to build them habitations in a wall-encircled town.
No, nor he who blessed mankind by teaching it to till the soil;
Or who pressed from juicy grapes the antidote to care and toil;
Or who used the reeds along the Nile for writing, having found
How to make a pictured symbol represent a spoken sound.
Those discoveries brought some solace to the race of men who bow
Underneath the heavy burden of life's miseries. But now—
Now at last we are admitted to the great gods' banquet hall;
Now we traverse all the heavens, and we probe this earthly ball
For the secrets locked within it; now we contemplate the vast
Changeless order of the universe unknown in ages past.

You who take delight in nectar and in heaven's ambrosial fare,
Sing with me the praise of him who laid the scheme of Nature bare—
Newton, who unlocked the treasury where Truth lay hid from sight;
Newton, loved of all the Muses; Newton, whom the god of light,
Phoebus, fires with inspiration. No unworthy thought can win,
No base passion stir his bosom. There the god has entered in,
And his holy presence fills the mind that sees the cosmos plain.
Nearer to immortal godhead mortal man may not attain.

SCIENTIFIC BOOKS

QUALITATIVE ANALYSIS

Semi-micro Qualitative Analysis. By PAUL ARTHUR and OTTO M. SMITH. xi + 322 pp. 28 figs. 15.2 × 22.7 cm. New York and London: McGraw-Hill Book Company. 1942. $2.75.

Semi-micro Qualitative Analysis. (The Barber Pres-