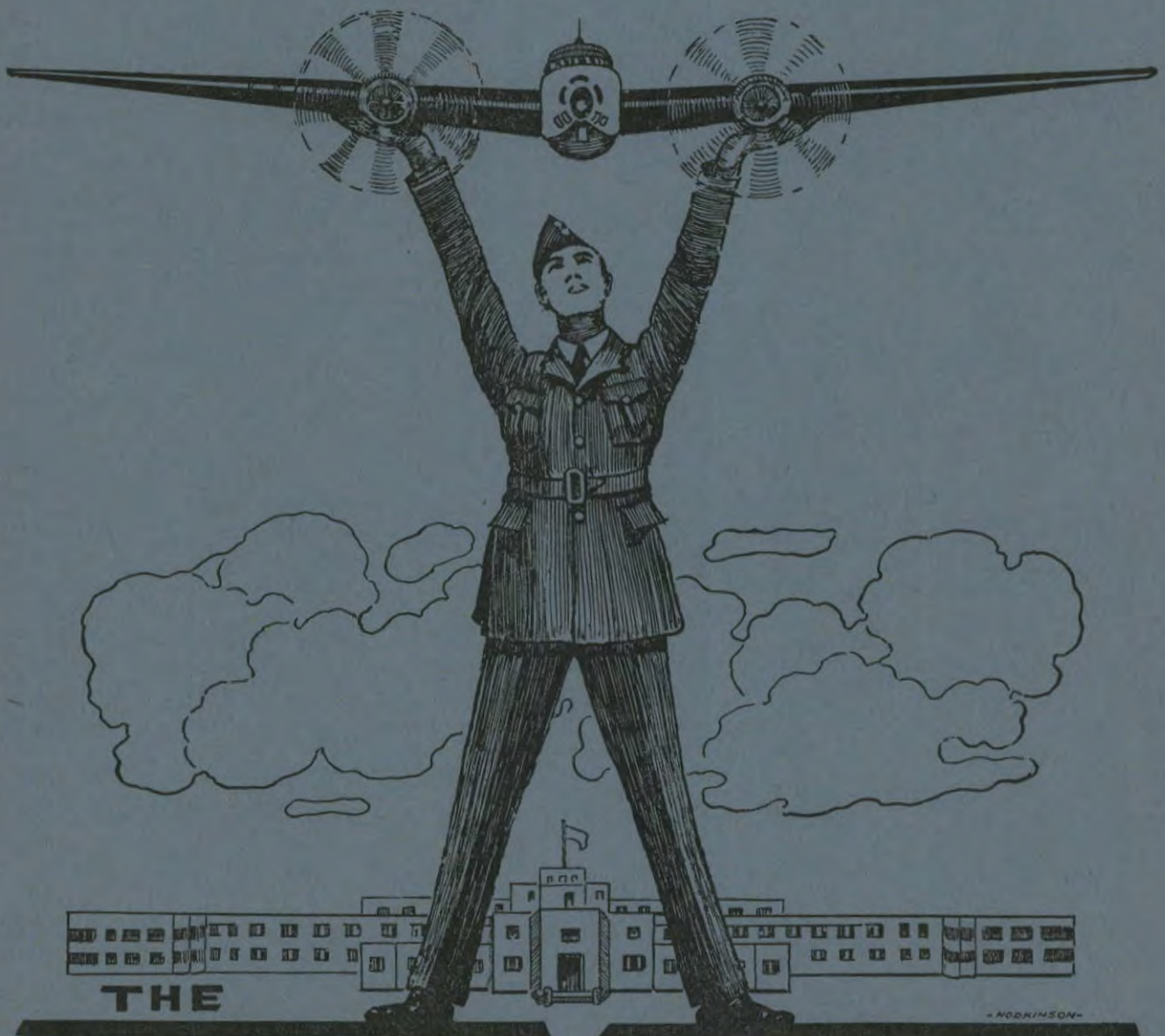
THE Aircraftman



TECHNICAL TRAINING SCHOOL

ST. THOMAS ONTARIO

[redacted]

THE AIRCRAFTMAN

A Magazine of the R.C.A.F. Technical Training School
Published Monthly at St. Thomas

VOL. 1 - NOVEMBER 1, 1940 - NO. 4

EDITORIAL STAFF

Managing Editor - E. R. McEwen (Director of Y.M.C.A. Services)
Editors - F/L Porter (Prot. Padre) - F/L Howard (R.C. Padre)

REPORTERS

No. 1 Wing, Sq. 1 - A.C. Powers, N.C.
Sq. 2 - Cpl. Lome, J.B.
Sq. 3 - A.C. Pearce, B.W.

No. 2 Wing, Sq. 1 - Cpl. McElwain, I.V.
Sq. 2 - L.A.C. Hutchinson, R.
Sq. 3 - A.C.1 Carroll, A.W.J.

E. & A.T.S., A.C. Byers A.F.

TABLE OF CONTENTS

A Letter from Air Vice-Marshal L. S. Breadner

MANAGING EDITOR,
"THE AIRCRAFTMAN",
No. 1 Technical Training School,
Royal Canadian Air Force,
ST. THOMAS, Ontario.

I have received a copy of the first issue of the "Aircraftman," which I have noted with considerable interest. I consider that the time and effort put into the publication of such a magazine is well worth while, and shows a splendid "esprit de corps" at the Technical Training School.

I should like to congratulate you, and those associated with you, on this work.

Yours sincerely,
L. S. BREADNER,
Air Vice-Marshal,
Chief of the Air Staff.

« « EDITORIALS » »

"AND AFTER"

Sir Edward Grigg, in discussing the recent Allied Forces Bill, said:

> "Britain at this proud hour is no mere home for helpless refugees. Britain, on the contrary, is a cave of Aeolus in which are penned for the time all the great liberating winds which, through the centuries, have swept the dark mists of oppression and barbarism from the life of human kind. . . I am confident that the day will come, brought nearer by this Bill, when this wind will sweep across the English Channel and the North Sea and drive out the foul miasma in which millions of our fellow human beings at this time are drawing every breath in misery and pain."

Sir Edward did not have time to say that these millions of fellow human beings were drawing breath only because they had hope . . . hope of a British victory. Life without hope is unbearable; life without hope under the Nazi manacles of body and mind, which even threaten the spirit, is doubly unbearable; but all over the world today news of the British resistance leaks along the "grapevine," giving support to hearts that are near breaking, and giving courage to those who continue to resist as best they can. The British bombers headed for objectives in occupied Europe trace below an invisible path of newly encouraged people; people who forgive a stray bomb just as long as the majority reach the hated enemy.

Mr. Winston Churchill, in thinking of England, said of the Air Force, that never had so many people owed so very much to so very few; the time will surely come when the same thing will be said of the British in relation to the whole world.

Lost in daily duties, examination phobia or the immediate need of successfully establishing the vital Joint Air Training Plan, we tend to forget the issues at stake in this great and thrilling struggle; seven days C.B., a period in the sick bay, sore feet, a crusty corporal or the foibles of the girl friend, cloud a vision we may have had of starving Poles, persecuted Czechs, murdered Chinese, Abyssinians, Spaniards, oppressed and bullied Norwegians, Danes, Belgians, Nederlanders, not to mention the remaining neutrals trembling in the shadows cast by the dictators.

Those of us in the service are all prepared to make the necessary sacrifices of sweat, tears and blood until victory has been achieved—but let it not be said that the sweat or tears so filled our eyes that we were blinded to the aims of the conflict.

A British victory is prayed for fervently today because we have, historically, with fewer exceptions than other empires, stood for liberty and justice. To turn these prayers into positive and active help we will need to offer the world a positive plan in which hope will be held out to all peoples, including the gangster-ridden Germans, an eventual share in rebuilding the new world.

We have a double duty; to give all we can in helping to sweep away the darkness which is Hitler and to prepare ourselves as best we can for life in the world after Hitler. A world where justice and freedom, thanks to the English speaking peoples, will be assured; a world where the French newsboy of three weeks ago who shouted "Qui veut pour dix sous de mensonges?" (Who wants fifty centimes of lies) will not go in fear of the concentration camp.

D. D.

* * *

A LETTER TO THE EDITOR

Why Not "Rest Camps" in Canada

Editor, "The Aircraftman"

Sir,—

No one can foretell the duration of the present war or foresee the development which will follow its conclusion, but it seems fairly safe to assure that the British Commonwealth Air Training Plan will establish itself more and more as an indispensable factor in Empire defence. On this assumption, I am putting forward a suggestion which I think will create a good deal of interest among readers. I refer to the establishment of Rest Camps for R. C. A. F. personnel at strategical centres throughout Canada.

Members of the R. A. F. whose tour of overseas duty took them to Egypt or India will probably be familiar with the schemes

formerly in operation there. In Egypt the scheme was run somewhat on the following lines.

The rest camp was set up in close proximity to and was controlled by the permanent R. A. F. station at Aboukir, near Alexandria. Accommodation and recreational facilities were provided for both single and married personnel at very low cost. Both camps were run on Service lines, but the degree of control and supervision was such as to grant the individual as much freedom as possible compatible with the general interest. All costs, including the return train fare, were paid in advance — a wise precaution this! During the Winter months the camp closed down.

The idea behind the scheme was to enable R. A. F. personnel to enjoy a holiday under conditions approximating as nearly as possible to those obtaining in the United Kingdom, at a cost within the reach of the poorest A.C.'s. Additional to this there was the opportunity to see more of the country.

Here in Canada, where distances are so great and recreational facilities so excellent, a similar scheme seems peculiarly appropriate. If it only enabled personnel to enjoy the wide and varied scenery the country has to offer it would be well worthy of serious attention.

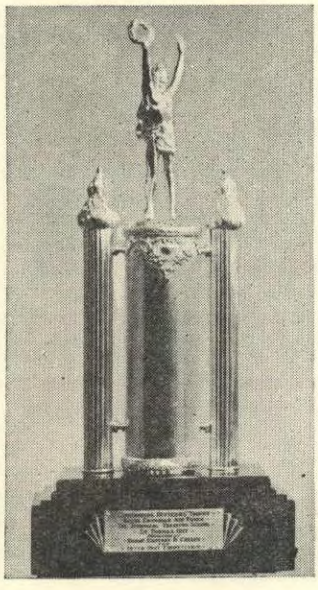
Whether or not such a scheme could be launched during the present hostilities is doubtful but, at any rate, I put the suggestion forward for what it is worth.

DE ASTON.

* * *

« « SPORTS » »

E. & A. T. S. HELD COMMANDING OFFICER'S TROPHY DURING MONTH OF OCTOBER



This Trophy is presented monthly by the Commanding Officer to the Unit making the best showing in the inter-Squadron sport schedules during the previous month.

E. & A. T. S., by putting forth super effort in the Drill Competition, which was the final event of the Commanding Officer's series, were able to snatch what appeared to be a sure victory from No. 1 Squadron, No. 1 Wing, the winners of the cup during the previous month.

The staff of the Aircraftman wish to congratulate all concerned in E. & A. T. S. for this remarkable victory. Although this group arrived at the Station nine days after the schedules were in progress, they were able to make all arrangements for postponed games and got matters sufficiently in hand to emerge victors.

The competition was so keen that at the beginning of the Drill Competition every single Squadron had a chance of winning the Trophy.

The Commanding Officer's Trophy series has proven to be very popular and it is expected that in the months that lie ahead the competion will be even keener.

The final results were as follows:

E. & A. T. S.	12½	points
1 Sq., 1 Wing	8	points
2 Sq., 1 Wing	7½	points
3 Sq., 1 Wing	7	points
3 Sq., 2 Wing	7	points
1 Sq., 2 Wing	5	points
2 Sq., 2 Wing	5	points

« STATION STATIC »

MORE DECIPHERINGS OF A.C. FUME'S PRIVATE NOTEBOOK

Engines come in cycles of four and cycles of two, only we never see the two cycles. Men come on one cycle called a bicycle, which is odd as it often has only one colander. It is all very confusing.

Engines which give power in spurts are piston engines. They give power in response to being urged and are called reciprocating when they do.

Engines have four strokes. Up, Down, Horizontal and Oblique.

Engines are prime movers and hence need priming. Priming is a shot in the cylinder which may put things on the blink for 48 hours, called a bye pass.

Engines eat spirit and will run on alcohol. Man is no engine but a very clever machine. (This is Fillersophy by me.)

Fuel is a mixture of Hydros, Carbons and Hot Air. The Hydros hang on to the Carbons and the Hot Air bets 14 to 1 they can't and so there is a bit of a bang, and everything gets hot which is the same thing as energy and it all ends up in a state of exhaustion or sumpn.

Fuel is cracked to make it more suitable for the Air Force; otherwise, it is a bit crude and is used by M.T. Oil is the sauce of gasoline, it all comes out of the same hole in the ground. Natural gas comes first as at St. Thomas and later the heavy stuff. Extracting gasoline is a very refined process carried out in large shells on Imperial lines. Gasoline is marsh gas but fatter and so easier to catch. It is light and so will catch fire. Stilling gasoline is a catch-as-catch-can game. It is usually only secured in fractions by a catalyst who is a down and out analyst who understands all about "molly-coddles" which are small bodies in combinations of various patterns.

Engines have parts for the purpose of coming to pieces; the principal parts are the biggest ones.

The crankcase is a metal box to keep the oil from splashing the paint work or pilot. Most of the engine is inside the crankcase, which makes it so difficult to get at; the crankcase is therefore made of Hideyoumillion, a rare metal related to Molly B. Denum and Al. U. Minum.

The crank shaft is a straight kinked lump of steel. "Cranks make revolutions but don't get anywhere." I read that somewhere. Crank shafts have pins that aren't pins, journals that aren't published, webs that aren't spun, counter weights that don't count. They are made of spring steel which, like spring lamb, is very lively. The kinks are put in to let the connecting rods swing by otherwise they wouldn't and it couldn't go round and they'd break.

Pistons are sort of cans that go up and down the colanders because they can't go anywhere else (there isn't any room). They have rings to save the fitters fitting them by hand. This is called makers tolerance. They get very hot from having to change ends very quickly. There are volumes about piston travels.

Connecting rods stop the pistons from bumping into the crank shaft and they have a big end and a small end because they look nicer that way and the fitter knows which is which by the size.

The Colander is the thing the piston goes up and down in. It is built with flukes. It has a head but no foot but has a jacket, skirt and sometimes a sleeve and a lining. It is a pretty smooth piece of goods. It has to keep a cool head or it goes to pieces. It is very expensive. The hotter things get the more it expands. You get the same thing in a car. The principal operation in handling these things is called lapping as it has no neck. If it loses its head someone gets into trouble.

There are other parts in the engine, but they don't matter much except perhaps the carburettor so called because it was originally a burette for cars. It stops the gas from running straight into the engine by making it go through all twisty by lots of slots, holes, tubes and so forths. It also air rates the gas like soda pop ready to pass the poppet valves into the colander whence it leaks out through holes in the piston to dilute the crankcase to give a weeks mixture. Carburettors have choking chewbs which is the reason why some engines cough and spit. There is a bleeding hole somewhere in this.

The gas floats about a chamber until it meets a meeting jet whence it suffuses into

thin air. Perfect carburation is present when an invisible flame is seen at the exhaust. An engine what pops is weak this can be avoided by using the poppy cock that controls the hot air to the instruction pipe. An engine what smokes is strong and smells accordingly. A poor mixture arises from using cheap gasoline, a rich one from expensive gasoline. Cheap gasoline knocks the expensive one, by detonation of character: when doped they stop this. They dope them with lead; a few drops called knock out drops will do it the amount required is called the Knocktane number.

There was a lot of stuff about cam rings and timings and things that went round the wrong way at one and a third time the engine turns and an open and shut diagram that looked like a roundel A. W. L., but my compression ratio wouldn't stand it so I just conked and made out an application for posting to Orillia on compassionate grounds.

* * *

"THE ENGLISH CARRY ON"

(*Written by an Airman's Daugher*)

"There'll always be an England,"
This is their battle cry,
When death comes raining down on them
From out the star-lit sky.

This valiant race of people
They take it all and grin;
They know their cause is right and just,
So they are bound to win.

"They shall not pass," "They shall not pass,"
Echoes along the shore:
For England always shall be free,
Now and forevermore.

The warnings call them from their beds
In the still of night,
Although they really need their sleep
They still pitch in and fight.

They see their homes all shattered,
Their loved ones maimed and gone,
And yet they have that certain will
Which helps them "Carry on."

Of course, each bombshell frightens them;
They're human, after all.
Yet, these people face it
And answer to the call.

Can you conquer people
With courage such as this?
Anyone who thinks so
Will find themselves amiss.

They'll stand the test with courage
Until the battle's won,
Thinking of King and country:
They're "Heroes," everyone!

* * *

CANADA EXPECTS YOU TO KEEP FIT

By An Airman

There is little doubt in the minds of the average Canadian today that the slogan "Canada expects you to keep fit" is more real in the minds of Canadians than it ever has been before. With the war clouds now red on the horizon and the general realization that manpower must be not only available but physically, mentally and spiritually the maximum, we know that we must start with our younger youth and build in them these things that are so essential. I know from personal experience that no other organization has attempted in such a large measure and with success to complete this challenge, than the Y. M. C. A.

Very often we, as individuals, have a general idea of what the Y. M. C. A. is doing across the world, but we have only to drop in at our own Y. M. C. A., St. Thomas, to see what it is accomplishing. One hundred and fifty young people meet three times a week, clubs for boys from eight to fourteen years of age are being developed into the leaders of tomorrow. Hobby groups, Public Speaking, Hiking groups for all ages are only a part of the plan to build Canada as the greatest country in the world.

We look with pride upon the Canadian youth today as they appear in uniform, mentally and spiritually alert, with well-developed physique, and are proud to know that some thirty-eight members of the St. Thomas "Y" have enlisted.

As an airman, I have always found the doors of the Y. M. C. A. open and the positive prevailing spirit of hospitality has, on so many occasions, been the answer to many problems. The free use of the Club rooms has allowed groups of people to entertain the airmen at Sunday evening supper parties and sing-songs which has helped in a great measure the morale of Canadian airmen.

The availability of swimming pools and recreation rooms has also helped many airmen to change lonesome hours into a real time of relaxation and sociability. In my mind, this

has been an important factor in today's war effort and at this time when the St. Thomas Y. M. C. A. is putting on a special Membership Drive, I feel that I am voicing the opinion of the men of the R. C. A. F. in wishing the St. Thomas Y. M. C. A. every possible success.

* * *

AN ODE TO OUR SERGEANT

By AC2 Byers, A. F.

It was a day in September, we all well remember—
In fact it was Friday the sixth,
When we stopped at the station in high expectation,
And there was a man called Sisk.

We gaped and we goggled, we flapped and we waddled,
An ungainlier bunch could not have been found;
We never were ready, we couldn't stand steady,
This was the problem Sisk found.

He can hear every rustle, and see every muscle;
He's got eyes in the back of his head.
You may rest assured that you're gonna be cured
Of the lazy life you've led.

With persistence and care and with cuss words rare,
He drilled us and never got cranky;
We did pretty fair, save when out in the air
There fluttered that G. D. white hankie.

As time wore along, we learned right from wrong;
But on drill we still were quite dopey,
When the Master of Drill bent us to his will,
And walked away with the Trophy.

To our great delight, he's been promoted to "Flight."
(The Air Force is taking no risk.)
For, wherever we roam, he'll always be known
To us as our Godfather Sisk.

* * *

"THE L. A. C."

(*Guide to pronunciation*: *L.A.C., "lack"; E.A.T.S., "eats"; A.A.C., "ack"; (x), Scotland*)

Alas, a L.A.C. will ne'er go back,
To the days of rookie duties;
He's now passed out of E.A.T.S. and A.A.C.,
Will soon speed up his tootsies.

The rattle of the Emma Gees,
Aimed high at Fritzie's "Messrs,"
Will help our L.A.C. to stand at ease
While his pants are at the pressers.

While pom-poms blare their strident note,
And sirens screech a warning,
Our hero L.A.C. is like to dote
On days past distant dawning.

When o'er the rim of Mother Earth
Old Sol rolls up in splendor,
Our L.A.C.'ll be spending leave in Perth (x)
And his "date'll" *know* he's the spender.

* * *

ARABIAN ADVENTURE

By W.O. Lipscombe, R.A.F.

Part of the make-up of the good A. F. M. and A. E. M. is a capacity for initiative and resourcefulness and it is this ability of the average airman to adapt himself to unusual circumstances that has made the Royal Air Force the model of efficiency that it is today, as the following indicates.

Several years ago the writer, with about twenty more technicians, was flying from Baghdad to Kowiet, on the Persian Gulf, in a Victoria twin-engined troop carrier. When flying over the Southern Arabian desert, many miles from the nearest civilization, we flew into a violent sand storm which forced the aircraft to land. The pilot was flying absolutely blind and unfortunately hit a small wadi on landing. This completely smashed the port undercarriage. We stayed with the aeroplane two days until the storm abated and then surveyed the damage. Obviously, we could not again take off with one wing tip in the sand and one undercarriage smashed, and due to the static electricity, set up by the recent storm, our radio was useless for the purpose of signalling for help. Things began to look serious when, after another day, we began to run short of water. Suddenly one of the crew said he thought he saw a way out of our difficulties and said he could get help if we could provide him with our spare money and another man to go with him. We gave them our spare cash and most of the remaining water and away they went. After a wait of a further 36 hours—when things were looking desperate—they returned with 20 donkeys, each in charge of an Arab boy. We were delighted and thought all we had to do was mount a donkey each and ride to the nearest post. But, no! those donkeys weren't meant to ride and the said airman explained his scheme and thereby gave us a

glimpse of the ingenuity for which the average aircraft crew is famous. We gathered around the port plane and lifted it; the donkeys were driven underneath and the plane was lowered on to their backs. The pilot started the engines and we all got aboard. The aircraft was, of course, now on an even keel with the port wing tip clear of the sand. As the engines were opened up, the donkey boys slapped the donkeys on the part they felt it most and they began to run till, eventually, we were travelling fast enough to take off, and we finally landed, none the worse for our desert sojourn.

* * *

THE GROUSER

By AC. Tutton

Once I was a citizen of credit and renown
But then I joined the Air Force
And went to Brandon Town:
They treated us like gentlemen
Until we signed our name
Upon the dotted line, and then
We got our ball and chain.

We stand in line for dinner,
We stand in line for tea,
In fact, there's lines for everything
It seems it has to B:
That's not our only worry,
If so that would be fine,
It's what they're serving out to us
At the end of that long line.

We're wakened every morning
When the whistle gives a toot,
Along the barrack hall there stands
Old Orpheus with his lute.
Then there's a general scramble
For socks, and pants, and all;
Just like a bunch of wildcats
Go scrambling down the hall.

Then someone jumps ahead a few,
Up goes a mighty yell,
And all along the winding line
The chorus seems to swell:
"Hold the line, hold the line,
And do not let him through";
But when there's six to one, or more,
Well! What's a guy to do?

Now that breakfast's over,
And the whistle calls us out,
"Fall in, the sick and lazy"
You hear the Corporal shout.
Then out of ranks they shuffle,
A seedy looking lot,
Off to the M.O.'s office
To tell the pains they've got.

Up roll our hot musicians
With trumpets, pipes and drums;
"Right turn! Quick march!" the Sergeant shouts,
"And get to school, you bums."
So into school we wander
With notebooks in our poke;
Some of us in serious mood,
And others for a joke.

So on we go, this happy throng,
From hour, to day, to week;
And nightly to St. Thomas
Pleasures and beer to seek.
And, when we reach the journey's end,
Up to the Golden Gates;
The lucky ones to pass right through—
Won't be the 28's.

* * *

TO THE GROUSER

By AC. Etone

My heart goes out (like hell it does)
To all those poor young guys
Who find the Air Force life so tough
They fill their days with sighs.

They say they held good jobs
Before Air Training had begun:
They all earned fifty bucks a week
And had a lot of fun.

They always ate, in those old days,
Cream chicken and caviar,
And drank nothing but champagne,
And drove a most expensive car.

The china at their table
Was nothing less than Crown,
The silver on their sideboard
Was 'most the best in town.

Now we have heard rumors
That a battle is begun,
And brave men fight and die
To save us from the Hun;

But some forget the war
And the suffering it has brought:

They think themselves abused
When really they are not.

Now, why did you join us?
To fight for Freedom's sake,
To make the world a decent place—
Or just to belly-ache?

* * *

HEDGE-HOPPIN' IKE WRITES TO HIS GIRL FRIEND

Dear Molly:

Well, I'm still here and the big house is getting more like home since I wrote you last. That strange lost feeling is beginning to disappear and I'm settling in to the meals just like I used to when I came to eat at your place on Sunday nights.

You'd be surprised to know how large the feeding bag is we muzzle into three times a day. In the morning we mouth back 650 pounds of bacon, at noon a ton of spuds, and at supper several barrels of applesauce. You'd think we were a thrashin' outfit instead of an Air Force. There's a lot of good victuals but a fella likes things a bit dainty now and again. But dickering things up fancy is a woman's job and there ain't no women allowed around this show. When you're a fightin' man and preparing to give the Hun what for, I reckon, you can hardly expect to have everything from soup to nuts. I said to Pete the other mornin' "How do you like the grub around here?" "Well," says Peter, looking very wise, "your liking of the grub depends on three things: how hard you work, how good's your digestion and how clear is your conscience. I eat three squares a day," says he, eyeing me to see if I was behaving myself like a good boy.

I am an A. E. M. When I told a lady in St. Thomas that, she was much impressed and said her husband had two letters after his name and I must be very brilliant to have three. She said her husband was a B.A., which I guessed meant "Bad Actor" but she was too polite to say it in full. Now an A. E. M. is a short way of saying Aero Engine Mechanic. We work in big hangars and take lessons from instructors who know their stuff so well that they can answer questions and explain things twice.

I went down to town the other night, since that's what's done on pay day, and I took a look around at the shops and the dames. I was introduced to a girl by a friend of mine and I said to her, "You are Sergeant Mac's girl, aren't you?" And she says, rather hesitating like, "Well, I think so." It seems that the girls around here aren't sure whether they've got the inside track or whether they're just filling in for the time being. I believe in being frank myself and never make love to another girl till I tell her that you're my gal and that when I get a couple of hooks we'll get hooked for keeps.

Well, so long, Molly, and give my respects to your folks.

Your loving boy-friend,
IKE.

* * *

THE STUDENT MECHANIC

By AC. Barclay, R.W.

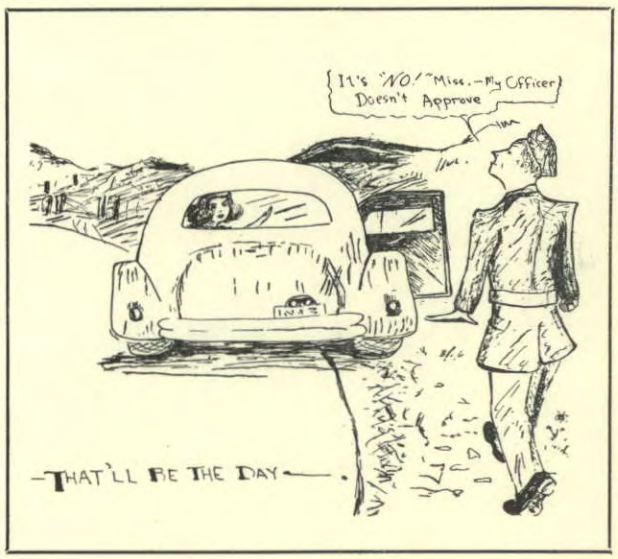
Out in St. Thomas Training School
A stubborn airplane stands;
And "Boone" an angry man is he
With trouble on his hands.

The carburetor seems to be
The cause of all his woe.
He tightens half a dozen nuts
But still it doesn't go.

He sits beneath the wing to think,
And gives his brain a chance to cool,
And ponders on his training
At the Technical Training School.

Then he starts the job once more,
And just by chance 'tis seen
The cause of all his trouble is—
He's out of gasoline.

* * *



TRUE TALL TALES

While walking along the two-hundred-foot high cliffs, which overlooked the river a mile wide at this point, I saw a pelican settle in the weeds opposite, leaving only its quaintly shaped head and bill to be seen.

With boyish enthusiasm I lifted my ordinary .22 Winchester and let drive, merely to see the long-rifle bullet hit the water half way over. Nothing daunted, I raised the elevation of my firearm and fired again. The bullet splashed three-quarters of the way over. With the rifle at an angle of 45 degrees, sights long since forgotten, I sent the third bullet. The pelican's head disappeared.

Rushing down to the landing, I seized the boat and rowed as fast as the law of motion would permit. Sure enough, there it was, stone dead with a wound in its head. Furthermore the wound was no ordinary one. The bullet in its long flight had flattened so much that its impact on the poor pelican had just about resulted in decapitation.

D. D.

(Articles to this column are welcomed. —Editor.)

* * *

FELINE FRAGRANCE

By F/Lt. Lighthall

(Inspired by the recent visit of a skunk to the School)

A vast and sprawly spider
Lies in a field of mire
And houses in its entrails
Some men we must admire.

One such, when day was breaking,
Came forth with stretch and yawn
To drive away the cobwebs
And gaze upon the dawn.

Behold, to lad's amazement,
A shadow from the night
Which past the guards had tiptoed
To see what it could sight.

About the buildings boldly
This fierce marauder crept
And would have slipped away unseen
If hero'd only slept.

But woe betide the skulker,
As at him charged so bold
The laddie of the Air Force,
And to his neck took hold.

He swung it from the pavement
And proudly marched away
To cast the prowler from the camp
And send it on its way.

Alas, the dusky villain
Disliked to be so foiled,
And turning on attacker
His ire fairly boiled.

The guardian of our safety
In sudden anguish felt
A blast of fury from the beast
So strong his heart did melt.

"My God!" cried he, in anguish,
"How little did I know
Of perils of the combat
To which I wished to go.

"I hear of raids on London,
Of blitzkriegs from the air,
But never were they bad as this
That bleaches white my hair.

"The chlorine gas of Wipers
Was not a patch on that
While mustard gas is roses
To what came from that cat.

"This varmint, in its fury,
Forgets the Hague Convention,
Where gas from warfare was debarred
As too vile an invention.

"Now where will I, with clothes so high,
Find place to rest my head?
If I return to barrack block,
My pals will shoot me dead.

"They'll have to dig a post hole
In which I can be planted,
Until the good earth sops it up:
That cat must have been h'anted."

Now from this tale idea springs
How Hitler can be shattered,
And Nazis from the world destroyed
And all their armies scattered:

We'll breed a batch of little cats
With stripes upon their backs,
And ship them over by the lot
In little smell-proof sacks.

Then on to Berlin they'll be flown
And scattered on the Hun,
And if that doesn't stop the war
Then nothing can be done.

STATION ACTIVITIES

AIR VICE-MARSHAL LLOYD SAMUEL BREADNER, D.S.C. VISITS THE SCHOOL

Lloyd Samuel Breadner, D.S.C., Air Vice-Marshal and Chief of the Air Staff, was among the air officials who visited this Station on Tuesday, October 15. He is a figure who, because of his responsible position and his own personal achievement, should be known to every airman. A glance at his forceful physique, quick actions and alert mind reveal him to be a dynamic individual, well fitted to get the most out of our great air program.

He was born in Carleton Place, Ontario, in the year 1894, and took his public and high school education in Ottawa. In 1915, he learned to fly in one of the early civilian schools in the United States. Proceeding to England in that year, he joined the Royal Naval Air Service and completed his pilot's course by further training over the North Sea and France. After the war, in 1919, he joined the Canadian Air Force, then organized by Lt.-Col. J. Scott Williams, and he remained with it during the developing period when it became the R. C. A. F. He has commanded R. C. A. F. Stations throughout Canada and discharged his responsible duties vigorously and efficiently. His elevation to Air Vice-Marshal and Chief of the Air Staff is regarded as his due as a man who can handle a big job capably. Air Vice-Marshal Breadner is a strong swimmer and can whack out a really good game of squash. He enjoys the respect of officers and airmen and we would like every man to feel that in Lloyd Samuel Breadner he has a friend and champion.

* * *

An Interested Group of Westerners Examining Tobacco being cured at the Robson Tobacco Farms during a recent Airmen's Tour.

* * *

KNOX PRESBYTERIAN CHURCH SPONSORS INTERESTING TOUR FOR OVER 200 AIRMEN

With members of Knox Presbyterian Church as their hosts, another large group of airmen of this Station enjoyed a motor tour through the fruit areas of Sparta and South Yarmouth on Sunday afternoon, October 6th.

The tour included side trips to Arthur Robson's tobacco farm at Union, Mrs. Mildred Martin's vineyards at Sparta, W. H. Mills' apple orchards and finally Thos. Jones' bird sanctuary.

The most exciting phase of the tour was the stop at the Martin vineyards. The tour was met by Mrs. Martin and her young son. They had thoughtfully gathered a large number of baskets of selected grapes and every airman was given a man's size sprig of grapes.

The tour was organized by the Station Y. M. C. A. Office.

« DO YOU KNOW? »

That 1700 Airmen have enjoyed the Sunday afternoon tours organized by the Station Director of Y. M. C. A. Services in co-operation with citizens of St. Thomas.

* * * *

That you are invited to join the Fencing Club which meets every Monday and Wednesday. For particulars, please inquire at the Y. M. C. A. Office.

* * * *

That the Baptist Church invites the Airmen to attend their Fireside Hour held every Sunday evening following the service.

* * * *

That Airmen desiring accommodation for their wives and families in St. Thomas may secure a list of rooms for light housekeeping, apartments and vacant houses from Padre Porter, Padre Howard or E. R. McEwen, Y. M. C. A. Secretary. The St. Thomas Times-Journal has provided us with a list of over 100 places offering accommodation to Airmen. Many have found satisfactory quarters with a minimum of trouble through the use of our catalogue.

* * * *

That you are invited to join the "Toc H" Club. For details, please contact Corporal Baker, No. 2 Squadron, 2 Wing.

* * * *

That the R. C. A. F. Camera Club meets every Wednesday night at 1830 hours next door to No. 1 Wing Orderly Room.

* * * *

That your uniform gives you full membership privileges in any Y. M. C. A. in Canada.

* * * *

That your contributions to this paper will always be appreciated.

* * * *

That recently William S. Knudsen told the American Legion convention that during the next 18 months Britain will get 40% of the U. S. airplane production and other armaments.

* * * *

That Canadian factories have on hand at present orders for 4000 aircraft. To date 500 airplanes have been completed and delivered.

That in spite of numerous claims to the contrary, there is still no positive proof that an airplane can sink a full-sized battleship. The Koenigsberg, German craft hit and sunk by a British bomb in South American waters, was a "pocket battleship" reported not as heavily armored as a full-sized warship.

* * * *

That first experiment in aircraft wireless communication was done in 1910 between J. A. D. McCurdie and Percy Morris.

* * * *

That airmen are not new in warfare. During the 1870 siege of Paris, balloons were used for the evacuation of important people and to communicate with points outside the siege zone. More than 64 balloons were dispatched.

* * * *

That one of the earliest airplane experimenters, Samuel Pierpont Langley, physicist of Washington, D.C., named his first few models "aerodromes." Many responsible authorities insist that his "aerodrome" was the first practical flying machine.

* * * *

That from the very beginning Germany has been air-minded. In the pioneering years, 1908 to 1913, they led the world in aviation interest, owning 400 planes during that period at a cost of $28,000,000. During the same period France was interested to about the same extent, also possessing 400 aircraft. Russia had 300; Italy 200; England 100 and the United States 28.

* * * *

That the most expensive airplanes in history were 196 defective aircraft which cost the United States approximately $1,000,000,000 during the last war.

* * * *

That airplanes are now used in the fishing industry, to locate schools of fish.

* * * *

That German parachutists attempting an invasion of the rich Netherlands East Indies would meet a sharp reception. Much of the ground on the islands is studded with sharpened bamboo sticks designed to impale any enemy parachutists.

The Tour is welcomed by Mrs. Mildred Martin and her son Ray, at the Martin Vineyards, Sparta.

* * *

The Rev. M. C. Davies of St. George's Anglican Church, Walkerville, has been posted to this Station and began his duties as a Protestant Padre on Monday, October 14. Padre Davies has had a four-year's chaplaincy experience with the Windsor Garrison and Essex Regiment Tank.

He enjoys meeting and knowing his fellows and everybody on the Station is going to find in him a good friend. Padre Davies expects to have his office in No. 1 Wing.

* * *

The hand of the Y. M. C. A. and Welfare work at our School has been strengthened by the recent posting to this Station of Mr. Douglas Deane. "Doug.," an Australian, has been about a good deal, having spent seven years in Europe followed by a year in the States, from where he has now come.

He brings to us an ardent enthusiasm for sports, a lively interest in Station events and a sincere desire to be helpful.

* * *

"There'll always be an Egypt,
While there's a British fleet,
Wherever there's a Battleship
With matelots running feet."
"There'll always be an Egypt
While there's a Naval gun
To shell the Ities on the shore
'Neath Egypt's blazing sun."

* * *

That little guy Hitler
Gets littler and littler,
And when on the run,
The troops won't need a gun
But a microscope or a welk-wittler.
(A "welk-wittler" is a wooden skewer for extracting welks from their shells.)

LIBRARY OPENS WITH BANG!
423 Books Issued First Week

The Y. M. C. A. in co-operation with Padre Porter, Chairman of the Library Committee, has opened a Station Library in their Reading and Writing Room.

In addition to books, it is hoped to secure subscriptions to many leading journals and magazines by which means an adequate opportunity will be presented to all those wishing to keep themselves informed of the latest movements in our rapidly changing world.

The servicing of the Library has been made possible through the many volunteers who have generously given help, and in this respect we would like to make special mention of the men of Bay "B1," Squadron 2, Wing 1, and Corporal Grant Millar.

* * *

Y. M. C. A. SUPPLY MOVIES TWICE WEEKLY

In the later part of September, the Y. M. C. A. extended their services to the airmen of this Station by supplying free "talkies" every Tuesday and Thursday evening.

This service is proving very popular with nearly 1,000 to 2,000 airmen enjoying every show. At first there was some difficulty with the acoustics but these troubles have been satisfactorily met, with the shows steadily improving.

As the paper goes to press, we have the announcement that the Canadian Legion will resume their weekly show, which was popular on this Station last winter. This will give this Station three free shows weekly.

* * *

Foaming at the mouth is a symptom of a political fit.

* * *

A Group of Airmen at Jones' Bird Sanctuary.

TECHNICAL TOPICS

"CORROSION" OF MATERIALS USED IN AIRCRAFT AND AERO ENGINE CONSTRUCTION

Introduction

1. The importance of the materials used in the construction of modern aircraft is not always recognized but the ever increasing calls for stronger yet lighter materials, longer life, easier maintenance and repair of airframes, higher horsepower, and longer life between overhauls of aero engines make serious demands on most of the materials used today.

There is no question that materials have considerably contributed to the attainment of the present high standard reached by aircraft, and although the introduction of new and stronger materials has been of influence, several other matters affecting materials and their application to aircraft are worth recording.

Perhaps the most important is the present reliability of aircraft materials when compared with those used a few years ago, and the study of breakages and failures, which for long after the year 1918 were far too frequent, has confirmed over and over again the necessity for ensuring the soundness of the material and consequential reliability of the parts, whether in the form of the split pin which locks a tiny nut or whether at the other extreme in the form of an engine crankshaft. By soundness is meant the absence of faults and defects in the material itself, i.e., in metallic materials, slag inclusions, discontinuity of grain flow, whether due to segregation, porosity or blowholes; unsuitable methods of rolling or forging —which are not always revealed by ordinary methods of inspection. Notwithstanding the fact that a material has fully complied with the specified requirements, parts made from these unsound materials are liable to fail earlier than if the material were sound, and when a failure occurs it is local and can be traced. It will be seen then that if design is to take full measure of the available strength and other properties of materials, which is essential in aircraft construction, weight being of vital importance, the greatest care and foresight must be exercised in selecting those materials. The responsibility lies with the manufacturer of the material no less than with the manufacturer of the aircraft. That both have realized the responsibility is evidenced by the comparatively negligible number of failures occurring in modern aircraft.

It must not be assumed that unsoundness just described is responsible for even the majority of breakages in aircraft; the causes of failure are many and any number are obscure. Failure has frequently been traced to faulty machining, sharp corners, and abrupt changes in section, all leading to local concentration of stress above that which the material is capable of withstanding. Minute hair cracks, scratches, and the effect of unequal heat treatment are among other items for which the material itself cannot be held responsible. Welding at one time was a fruitful cause of failure, but the process as such was not at fault, the trouble being solved in the selection of steels suitable for welding, and any number of aircraft are today proving exceptionally reliable with welded tubular construction.

Corrosion

2. Innumerable failures have been traced to corrosion, particularly on flying boats and seagoing aircraft, notwithstanding that the fittings and parts were intentionally made substantial with a high factor of safety to allow for deterioration. In many instances, although corrosion was apparent, investigators were not satisfied that breakage was due to loss of strength resulting from reduction in section; the results of recent researches into the effect of inter-crystalline corrosion on fatigue has justified their conclusions. This research work has clearly proved that almost negligible stresses will lead to failure if the part under stress is functioning in conditions inducing corrosion. The combined effect of stress and corrosion is so pronounced that materials highly susceptible to corrosion have a higher fatigue range when stressed in a neutral atmosphere than when stressed in an ordinary clean laboratory atmosphere. This important work on corrosion fatigue may very well lead to an explanation of some obscure failures on land aircraft; it certainly suggests that streamline wires which are particularly subject to alternating and fluctuating stresses should be efficiently protected against corrosion.

Cause and Prevention

A dictionary explains "Corrosion" as "the eating away by chemical action, such as rust-

ing"—and thus dismisses a subject which costs literally millions of dollars a year and is a constant problem to engineering companies.

When a metal corrodes it undergoes chemical changes, ceases to become a metal as such and becomes a metallic salt; this is only natural since in the beginning the metal was originally found in the earth in a somewhat similar form. It had probably been in the earth in this stable form for thousands of years and it is only reduced to its true metallic state with much difficulty, therefore the forces of nature acting upon metals tends to change them back again to their stable form as oxides, compounds of oxides or sulphides. It is somewhat astonishing to find that it is possible to defeat these natural forces to such an extent as to maintain, in prolonged existence, the great quantities of metal on which modern engineering depends. Some metals have a greater tendency to corrode than others. If there are two metals exposed to corrosive influences, it will be found that the metal with the higher electro potential will corrode, while the other metal is actually protected. Take for example zinc and copper; if these metals are brought into contact in a mild acid solution it will be noticed that the zinc will corrode while the other does not, zinc having the higher potential. Zinc has a higher potential than iron and this fact is taken advantage of to use it for protecting steam boilers against corrosion, plates of zinc being suspended inside the boiler and any corrosive action attacks the zinc leaving the boiler plates protected. Another protection which has been used successfully consists of applying an independent positive electric current from an outside source to suitable carbon blocks inside the boiler; such a current acts similarly to that used in a plating vat, i.e., it tries to plate the carbon on the sides of the boiler, although of course this does not actually happen but as the current has that tendency, corrosion cannot attack the boiler and the boiler plates are thus cathodic or negative and therefore protected. It is always the more positive metal or element or that which carries a positive flow of electricity which is eaten away.

Surface Corrosion: As very light sections of thin gauge metal are used in airframe construction, corrosion will soon weaken such structures and cause failures. Careful and systematic inspection must be made in order to detect signs of corrosion and immediate steps taken to arrest its progress before penetration takes place.

Fortunately, surface corrosion is easily visible in the form of a powdery deposit on the surface of the metal. On aluminium and its alloys it is white or light gray in color, on iron or steel in general it is brownish red (rust), on stainless steels, a reddish stain, and on copper and its alloys it shows as a greenish stain or powder. These oxides should be removed by a suitable solvent and a stiff brush.

Abrasives should never be used on light metal parts; the depth of penetration observed, if this penetration is excessive the part should be rendered unserviceable, but if slight it should be coated with a protective coating similar to the adjacent parts, after thorough cleaning.

Inter-crystalline Corrosion: Corrosion in this form is extremely dangerous; there is no oxide powder on the surface of the metal as a visible warning and the only apparent signs are minute pit marks or cracks which can only be determined by the most careful examination, as although the metal may appear sound it may be on the point of collapse: however slight the indications of this type of corrosion may seem to be, the part should always be considered unserviceable. Fortunately, however, inter-crystalline corrosion is not as common as surface corrosion, but it does attack steel and aluminium alloys, affecting the crystal boundaries inside the metal and rendering the metal weak and brittle.

Corrosion of Steel: In considering the corrosion of steel, the composition of the alloy and the heat treatment—which controls the internal structure—are the main factors for determining the degree of corrodibility.

The same steel, if heat treated, will tend to corrode more readily in one set of conditions than another and, when under stress or load, its corrosive values are increased, again due to altered structures inside the metal. Surface finish on a steel article plays a part in its corrosive tendency, as it has been found that highly polished parts are more resistant to both corrosion and fatigue than ordinary machine finished parts.

Corrosion of Duralumin: Duralumin is liable to suffer from both types of corrosion; microscopic examination will reveal inter-crystalline corrosion but as this is not feasible for components on an aircraft, an attempt should be made to bend the suspected part; should simple bending result in the fracture of the metal it may have been embrittled by inter-crystalline corrosion. This test, however, should only be applied using extreme care.

Corrosion of duralumin may be caused by contacting pieces of the alloy in different states of heat treatment, i.e., normalized and annealed metal will react to each other and cause rapid corrosion on the annealed portion. It is, there-

fore, important to use all duralumin in the normalized condition as apart from the greater strength obtained in this manner; its powers of resistance to corrosion are at a maximum. It is not advisable to rivet duralumin and steel, or duralumin and brass, or copper together since galvanic action is set up between the metals with almost certain corrosion.

In perfectly dry air, corrosion cannot take place but dampness in the air will produce the electrolyte necessary to start galvanic action. In some countries the atmosphere is always humid and there is no escape from the moisture content.

Protection Against Corrosion: An everlasting remedy for corrosion has yet to be found for the majority of metals in common use.

The great advance in recent years in the introduction of stainless steels has shown that a real start on the problem has only commenced.

Various coatings such as enamels, paints, varnishes, electro-platings, galvanizing and more temporary treatments have been devised with the object of defeating surface corrosion. These coatings are reasonably effective as long as the surface remains unbroken, but scratches and cracking of the skin expose the surface of the metal and corrosion ensues. Where rubbing contact takes place, surface coatings are useless and stainless steel and monel metal should be employed. Where dissimilar metals are fitted together, care must be taken to avoid bringing them into direct contact; and fabric soaked in oil, varnish or enamel must be interposed to reduce the danger of corrosion.

Anodic Treatment: Aluminium and alloys of aluminium are usually anodically treated as an anti-corrosion precaution. The anodic treatment is actually a reversal of the electro-plating bath; when electro-plating is being carried out the current flows from the substance used for plating to the object being plated but in the anodic bath the current is actually flowing away from the job to plates of graphite or stainless steel and the treatment results in a film of aluminium hydroxide being extracted from the interior of the metal and left on the surface: this film resists corrosion very strongly.

Preparation Prior to Treatment: The parts should be cleaned with gasoline-benzol or solvent naphtha, dried and finally washed with hot water before putting into the bath. Parts that have been treated in the salt bath should be inspected for removal of all traces of salts. The contacting faces of all built up fittings should be buffed before assembly and immersed in boiling water before being placed in the anodic bath. Welded aluminium fittings should be kept in boiling water for 30 minutes before anodic treatment to remove all traces of flux residue effectively as these would result in severe pitting.

Composition of Bath, Construction and Operation: The electrolyte consists of a solution containing 3% chromic acid and distilled water. This solution is contained in a sheet iron tank and is maintained at a temperature of 40 degrees centigrade, plus or minus 4 degrees by means of heating and cooling coils fitted at the bottom of the tank, a thermometer is provided to check the temperature from time to time.

Two sets of rods or tubes are installed over the bath, each set being connected to one of the poles of an electrical supply, while all are insulated from the bath itself. The necessary instruments to measure flow and pressure of the electric current are installed in these leads to the tubes.

From the negative or cathode tube plates of graphite or stainless steel are suspended in the solution, from the positive or anodic tube the jobs to be treated are suspended; both suspended elements must be completely immersed with the solution of electrolyte, but on no account must they touch the sides of the bath or each other.

A mechanical agitator or stirrer is installed in the bath to prevent oxygen bubbles forming on the surface of the job, thus preventing the formation of the anodic film.

The bath should not be touched while the current is switched on. The current density is 3-4 amperes per square foot of the job being treated.

The voltage is raised steadily from 0 to 40 volts over a period of 15 minutes and remains steadily at 40 volts for a further 35 minutes and is then raised from 40-50 volts for the next five minutes and then remains steady at 50 volts for the final five minutes of the hour, the current is then shut off and the job removed. The work must then be washed thoroughly in hot water and dried. Dark stains may appear on the surface due to chromic acid, but these are not detrimental.

A visual check of the coating is usually satisfactory, but a check may be carried out by applying a cheap dye such as indelible pencil to the surface, subsequent rubbing with a damp rag will not remove the dye if the anodic film is satisfactory. The coat that is formed by this process is very thin and every effort must be made to protect it from being broken, it is fre-

quently supplemented with either varnish or cellulose enamel for this purpose.

Cadmium and Zinc Plating: This treatment consists of a coating of pure cadmium or zinc which is electrically deposited on the outside surface of steels, brasses or bronzes.

Composition, Construction and Operation of Bath

The bath consists of an iron tank, containing the following electrolyte:

For Cadmium Plating—
- 1½ - 3 ozs. Cadmium Cyanide,
- 5 - 10 ozs. Potassium Cyanide,
- to each gallon of distilled water.

For Zinc Plating—
- 12 ozs. Zinc Cyanide,
- 6 ozs. Sodium Cyanide,
- 4 ozs. Caustic Soda,
- to each gallon of distilled water.

The overhead arrangements of the two sets of tubes, one positive and the other negative, are the same as for the anodic bath, but the suspended members are different and are arranged in the following manner: Anodes are pure cast cadmium for Cadmium Plating and pure cast zinc for Zinc Plating. The cathodes in each case are the jobs to be coated.

The temperature of the bath should be:
- 15° Centigrade for the Cadmium Bath.
- 40° Centigrade for the Zinc Bath.

The current density is:
- For Cadmium—10 to 15 amps per sq. foot of surface of job.
- For Zinc—2 to 4 amps per sq. foot of surface of job.

The current pressure is:
- For Cadmium—3 to 4 volts.
- For Zinc—3 to 5 volts.

The work should be thoroughly cleaned down to the metallic surface and washed in water before treatment, the methods in use include sandblasting, caustic bath, scratch card brushing and scrubbing with pumice powder.

With cadmium coating a more uniform coat is obtained if the solution is continually agitated. The time for the process will depend somewhat on the area being treated but it is approximately 30 minutes. Care must be exercised to prevent the work being done too quickly as this results in a porous coat of poor quality. The thickness of the coat should not be less than $\frac{3}{1000}$" and can be determined by weighing or by direct measurement.

In order to remove any brittleness as a result of this process, the job should be washed in cold water, and then heated to a temperature of between 100° and 200° Centigrade for not less than 30 minutes.

Stove Enamelling: This process is the most satisfactory for the protection of steels which have a natural oxide on the surface left from hot rolling or drawing, as it may be applied to any clean, hard surface. The oxide film is in itself a protection against corrosion.

This process is also satisfactory for brasses and bronzes. It consists of dipping, brushing or spraying with enamel and heating in a stove or oven to harden the coat.

Method:
1. Clean the work with spirit.
2. Sweat in the stove for one hour (not to exceed 170° Centigrade).
3. Cool and wipe over with a dry rag; do not handle.
4. Dip or spray with enamel.
5. Hang and allow to drain for one hour.
6. Remove any drops with a small, soft brush.
7. Bake in stove at 170° Centigrade for approximately 2½ hours, the vent being left open during the first hour.
8. Allow to cool down with the stove to avoid stripping.

Subsequent coats need only half the above stoving time. The temperature of 170° Centigrade should not be exceeded as there is a danger of melting any soft solder or tinning. Boxed up fittings should have drain holes to allow the enamel to drain freely.

Enamels

These are applied with a spray or brush and are primarily suited for the protection of repair work, such as patches or to restore a protective covering to a component which has had its original treatment damaged by scratching, etc.

Enamel Air Drying—
- Black: for use with steel repairs.
- Grey: For use with light alloy repairs.

Application: In general, the application of paints and enamels is so simple that very little apparatus is required, but the following points should be observed:

See that brushes and pots are clean and that the enamel is of the correct consistency, and

only correct thinners are used. That the job is carried out in a dust-free atmosphere, and that the surface is free from rust-oil-dirt and dust. The coat should not be applied too thick, and one coat should be dry before the next is applied.

Paints and varnishes may also be used, and may be applied with a spray or small brush; they are sometimes used on top of a more permanent finish to give an additional protection.

Paints with a "Lead" base are **not** to be used on Aircraft work.

Other Anti-Corrosive Treatments in General Use

Hot Galvanizing: This process consists of pickling in a caustic bath, then dipped in a bath of molten zinc (the work having previously been dipped into a hydrochloric acid solution), for a period long enough for the work to reach the temperature of the bath which is held at 425°-480° Centigrade. It is then withdrawn and coating set in cold water; sal ammoniac is used as a flux. This treatment applies to sheet steel.

Coslettizing: For steel parts which are in contact with oil, it is a fine black finish. Fittings are sandblasted and placed in a bath containing a solution of phosphoric acid, granulated zinc and water, in which they are gently boiled for 2½ hours.

The parts are then removed from the bath, rinsed in boiling water, and dried off as rapidly as possible in an oven; whilst still hot at about 200° C., all superfluous deposit is brushed off and the part immersed in mineral oil. The oiling is an essential part of the process.

Calorizing: Steel parts are packed in a drum with granulated aluminum, and heated; or alternately the parts are immersed in a bath containing molten aluminum. Steel so treated will stand high temperatures without oxidizing. This process gives actual impregnation of the base metal by the aluminum.

Bower Barf: This process is used on steels which are to be kept in storage. It consists of placing the parts in retorts and raising the temperature to a red heat. Superheated steam is then injected into the retorts for about 30 minutes. The steam is then shut off, and a small amount of naphtha is then injected, and the steam then turned on again for a further 30 minutes. It is then shut off and allowed to cool down to 420° C., when the work is removed and dipped in heavy oil while still hot. The resultant coat of black oxide is permanent.

Sheradizing: This consists of cleaning the steel parts by sandblasting, or similar process, and placing them in a sealed chamber or drum, together with zinc dust and boxwood sawdust, the work is held by suitable jigs or clamps to prevent tumbling. The container is placed in a furnace and the temperature raised to 380° C. plus or minus 50° C., and the drum revolved slowly for 6 hours. A coating of ⅝ ozs. per sq. ft. is satisfactory.

Metal Spraying: Coatings of zinc, copper, aluminum, brass, or other metals may be deposited on the clean surfaces of other metals by the Schoop process.

This consists of feeding the coating metal as a fine wire into a spray gun, where it meets a reducing flame of oxy-acetylene, when it becomes molten and is projected on to the surface by an air jet at 50 lbs. per sq. inch. This process lends itself to the easy coating of work which cannot be dissembled for coating by other methods.

Metallization: This is carried out by spraying aluminum on to the surface of the work, and then covering the coating with Bitumastic paint, and subjecting the part to a suitable heat treatment in order to bond the aluminum to the steel. This process is very suitable for exhaust manifolds.

Chromatic Immersion: This treatment is used for magnesium light alloys. The parts are immersed in a bath containing potassium and ammonium di-chromate; ammonium sulphate and ammonium for a period of 30-45 minutes.

The solution must be kept boiling all the time. The finished dark brown surface must not be broken; a supplementary protective coat of varnish or cellulose enamel is usually given. The preliminary cleaning may be carried out by immersing in a boiling solution of 2% caustic soda, followed by washing in cold water.

Stellite: This comprises 4 to 16 per cent tungsten, 30 per cent chromium, and 66 to 54 per cent cobalt. The higher the tungsten the more brittle the material becomes. It is highly resistant to hot and cold corrosion attack of leaded fuel, and has been used as a facing for valve seats and seating. It is also welded to the tips of valve stems on account of its resistance to abrasion.

Conclusion: From the problem of **"Corrosion"** it will be gathered that the importance stressed on **"Cleanliness"** of aircraft and aero engine materials is at all times of vital importance to the mechanic in charge of an aircraft for the maintenance of its "serviceability."