## FGEHEISDEAD



## THE BLISS School of Electricity

Bliss Building, WASHINGTON, D.C.


5ㅍoward Chainless Bicyclea
 BUY TELEPHONES The Warme Conaty Are Good--Not Cheap Things



WESTERN TELEPHONE CONSTRUCTION CO.
The Larjoes Manufacturers of Telephones in the U.S.
 . Pearson mfg. co. Main \& Locust Sts.s., - श XRAY M X R RAY NAMERA
 CROOKES TUBES AND ROENTGEN'S







Oi)RAMS ${ }^{\text {Thar Doable Acting Ran }}$ $\substack{\text { Rhat } t, \\ \text { than } \\ \text { than } \\ \text { tin }}$

## Towers, Tanks and Tubs

patent sectional
AlL IrON TOWERS
ALL WOOD TOWERS. ELEVATED TANKS
or Automatic Fire Sprinkler Planta, Louislana Red Cypress Tanks
W. E. BALDWELL FO 219 E. Main Street,
ouisville, KY., U. S. Twelfth Erdition io ow Realy. the scientific american CYCLOPEDIA OF
Receipts, Notes and Queries 12,500 RECEIPTS. 708 PAGES.

THisgreat


 caled for.
It ${ }^{\text {is }}$ entirely
distinctfromethe dirdinartromtheceipt book in being
thoroughly up
to date. thorougbly up
date work may e regarded as
the product of of
the studies and the studiee and
practical ex-
perience of the perience of the
ablest chemis
and workers in

world; the the information given betng of the highest
allue.arranged and condense in in concise form convenient for ready use. Almost every inquiry
that.can be thourht of relating to ormu: used
in the various mannfacturing industries, will hele $\leftrightarrow$ found answere
Those who are engaged in almost any branch
of industry will far in this book much that
is of is of practical value in their respective call
ins. hhose who fre in bearch of indepe ndent
busineso ings. Those who are in bearch of indepe ndent
busines or "mnloyment, relating to the bone
musegequcture of slable articles, will tand in it neg tacture of splable articles, will
Nond for descriptive circular.
\$50 Buys The Highest Grade, Best Made Machine Ever Offered.

THE HARTFORD
No. 2.
New and important features: side gutde. made wide, with side guide. Alignment perfect. Ribhon moves crosewise and
lengthwise automatically. lengthwise automatically. action the lightest made.
Everything guaranteed. cular free.
CO.,

## 

TELEPHONES Bad patat to mintatures and desoriptinns with loweet prices. The 1


## DEAFMESERCURERITHE


MANUFACTURE OF STARCH FROM



ROSE POLYTECHNIC INSTITUTE




## SCIINCE\%MECHANICS



 CONTRACTS WANTED.







Experimental \& Model Work

## PROPOSALS.

## 

 SUPPLY of 150,000 tons of steel rails and other Permanent Way Materials to be Manufactured in the Colong or New Sonth Wales.Orers are hereny Invited by thu Government of New
South Walles, Australla, and will be received by the South Wales, Australia, and will be recelved by the
Secretary for Public Works in sydney, and the AgentGeneral for New South Wales in London, up to 11:30 o'clock on the 3th day of December, 1898, from per ons Willing to contract for the supply of 150,000 tons or steel ralls and the necessary quantity of wish-plater Fisb-bolts and Spikes. manufactured in the Colony of New South Wales, out of fron ore and other necessary minerals the natural product of, and with coal,
coke, or other fuel, smetted, gotten and raised within the sald Colony, upon the Terms and Conditions which can he seen at the Offices of the Minister for Public Works, sydney (or the Agent-General for New South wales, London),
h. soung.

## 

ETV ESTABLISHED 1S45
The Most Popular Scientific Paper in the World Only \$3.01n $\begin{gathered}\text { Yenr, Including Postaxe. } \\ \text { Weeklros }\end{gathered}$
This wilelr circulatelland splendidy illustrated paper is pubished weekls. Every number contains six-
teen pages of useful information and a large number of original enkravings of new inventions and discoveries, representina Engineering Works, Steam Machinery,
Vew Inventions, Novelties in Mechanica, Manufactures New Inventions, Novelties in Mechanics, Manufactures, Chemlatry, Flectricity. Telegraphy, Photography, Archl-
tecture, Agriculture, Horticulture, Natural History, etc. Complete list of Parents each week.
 postage prepaid, to any subscriber in the United States, Canada, or Mexico, on receipt of 'Whice 11011 wis by
the publishers; six months, 81.50 ; three months, 81.00 . ellubs.- Special rates for seve masters. Write for particulars. T'he safest way to remit is by Postal Order, Draft, or
Express Money Order. Monas carefully placed inside of envelopes, securely sealed, and correctly addressed, seldom goes astray, but is at the sender's risk. Address
all letters and make
 This is a separate and distinct publication from The
SCIENTIYIC AMERICAN, but is uniform therewith in size, every number containine sixteen large pages full
of engravings, many of wnich are taken from foreign papers and accompanled with translated descriptions. The Scientific american sopplement is published weekly, and includes a very wide range of contents. It
preeerts the most recent papers by em'nent writers in presthe principal departments of Science and the Useful Arte, embraclng Blology, Geology, Mineralogy, Vatural Hlstory, Geography Archæology, Astronomy, Chemis-
try, Electricty, Light, Heat, Mechanical EngIneerIng, try, Electricity, Light. Heat, Mechanical Engineering, Steam and Ralimay Eneineering, Mining, Ship Bull Man.
Marine Engineering, Photography, Technology. Manufacturing Industries, Sanitary Engineering, Acriculture. Horticulture, Domestic Eccunoziy, Rlog phy. Medicine,
etc. A vast amount of fresh and valuable information etc. A vast amount of fresb and valuable information and Manufactures at home and abroad are illustrated and described in the SDPPLEMENT.
Price for the SUPFLEmint. for the United States, Canada, and Mexico, A5.00 a year; or one copy of the
SCIENTIITC AMERICAN and one copy of the SOPPLEM ENT, botb mailed for one year to one address for 87.00 .
Single, copies, 10 cents. Address and remit by postal Single copies, 10 cents. Adiress and remit by postal
nrder, express money order, or check, - - - -

The Scisntific American Boilding Edition is
issued monthly. 82.50 a year. Single copies, 25 cents. Thirty.two large quarto pafes. forming a large and
aplendid Maeazine of Architecture, tichly adorned with aplendld Maeazine of Architecture, richly adorned with
elepant plates and vther fine engravings; Illuatratlog the most interesting examples of modern Architectural Construction and allied subjects.
A special feature is the presentation in each number
of a variety of the latest and best plans for private real. dences. city and country, including those of very moderate cost as well as the more expensive. Drawings in
perspective and in color are given, tozether with Floor perspective and in color are given, together with Floor
Plans. Descriptions, Locations, Estimated Cost, etc. The elegance and cheapness of this magnificent work
have won for it the larzest (is culation of any ane won for it the ingest dincolintion of any
Architoctural publication in the world. Sold by all newsdeaiers. 82.50a year. Remit to
MUNN $\mathbb{C E C O} \mathbf{C l} \mathbf{3 6 1}$ Brondway, New Yor

## Gxpoxt Gdition

of the Scientipic American, with which is incor-
porated "La America Cientifica e indostrial," porated LA America CiENTIFICA E INDOSTRIAL."
or Spanish edition of the BCIENTIFIC AMERICAN Is pub.
ilshed monthly, and is uniform in size and typogra lishod monthly. and is uniform in size and typograplyy
with the scientific American. Every number contains about 50 pages, profusely illustrated It is the finest sclentifc, industrial expo t paper published. It clrculates throughout Cuba, the West Indies, Mexico, Cen-
tral and South Amerlea, Spald and Spanish possessions traland South Amerlea, Spaln and Spanish possessions

- wherever the Spanisb language is spolen. TBE BCIentipic american export Edition bas a large guaranteed circulation in all commerclal places throuph-
out the world. out the work. s.i.0 a year, pos.
world. Single copies, 25 cents.
world. Single coples, 25 cents. Manufacturers and others who desire to secure forelgn trade may bave large and handas...mely displayed
announcemen ${ }^{\text {®a }}$ publisbed in this edition at a very moderate cost. Rates upon application.

